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MATCHING IN THE MARKET FOR M&A ADVISORY SERVICES

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HELSINKI SCHOOL OF ECONOMICS
Master's thesis in Finance
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ABSTRACT
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MATCHING IN THE MARKET FOR M&A ADVISORY SERVICES

OBJECTIVES

This thesis has two objectives. First, the aim is to present a model for firm-investment bank matching and discuss its applicability to the market for M&A advisory services. Second, this thesis seeks to empirically examine the model and provide new evidence on the matching of firms and investment banks in M&A advisory services. The model presented is based on two-sided matching and hence departs from the extant literature which has thus far largely assumed the matching to be one-sided. However, this thesis does not seek to explicitly reject some other view, for instance a view based on one-sided selection. In fact, it would be extremely difficult to formulate hypotheses that would be able to differentiate between one-sided and two-sided matching.

DATA

The implications of the model are examined with a rich data set comprising of 5713 firm-investment bank pairs and M&A transactions from the United States. The sample period covers 20 years from 1984 to 2003. Data on the firm-investment bank pairs and transactions is from SDC Platinum database. Additional data on firms is retrieved from Worldscope database.

RESULTS

I first note that the empirical results are consistent with the implications of the model. Thus, the model appears to perform well in predicting the matching of firms and investment banks. In addition, I report several findings that, to the best of my knowledge, are new to the literature on M&A advisory services. First, I document that firm size and deal size are substitutes for each other as determinants of the matching. Second, I verify the role of subsequent M&A activity in the matching. Third, I show that there is a relationship between the market share of high reputation investment banks and the overall market activity. Fourth, I link high reputation investment banks' client quality to the overall firm quality in the market.

KEYWORDS

Investment banking, advisory services, M&A, matching.

HELSINGIN KAUPPAKORKEAKOULU
Rahoituksen Pro Gradu -tutkielma
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TIIVISTELMÄ
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PARINMUODOSTUS YRITYSKAUPPOJEN NEUVONANTOPALVELUISSA

TAVOITTEET

Tällä tutkielmalla on kaksi tavoitetta. Ensinnäkin tarkoituksena on esitellä malli yritysten ja investointipankkien parinmuodostuksesta ja käsitellä sen sopivuutta yrityskauppojen neuvonantopalveluihin. Toiseksi tämä tutkielma pyrkii empiirisesti tarkastelemaan em. mallia ja tarjoamaan uutta tietoa yritysten ja investointipankkien parinmuodostuksesta yrityskauppojen neuvonantopalveluissa. Esitelty malli perustuu kaksipuoliseen parinmuodostukseen ja eroaa täten aiemmasta kirjallisuudesta, joka on olettanut parinmuodostuksen olevan yksipuolista. Tutkielman tarkoituksena ei kuitenkaan ole pyrkiä suoraan hylkäämään jotain muuta näkemystä, esimerkiksi yksipuoliseen parinmuodostukseen perustuvaa näkemystä. Itse asiassa olisi erittäin vaikeaa muodostaa hypoteeseja, jotka pystyisivät erottelemaan yksi- ja kaksipuolisen parinmuodostuksen välillä.

AINEISTO

Mallin implikaatioita tarkastellaan laajalla aineistolla, joka käsittää 5713 yritys-investointipankki paria ja yrityskauppaa Yhdysvalloista. Aineisto on vuosilta 1984–2003 eli kattaa 20 vuotta. Tiedot yritys-investointipankki pareista ja yrityskaupoista ovat SDC Platinum tietokannasta. Aineistoa on myös täydennetty yritysten osalta tiedoilla Worldscope tietokannasta.

TULOKSET

Ensinnäkin havaitsen, että empiiriset tulokset ovat yhteneviä mallin implikaatioiden kanssa. Näin ollen malli vaikuttaa onnistuvan hyvin yritysten ja investointipankkien parinmuodostuksen ennustamisessa. Tämän lisäksi raportoin useita havaintoja, jotka parhaan tietoni mukaan ovat uusia yrityskauppojen neuvonantopalveluita käsittelevässä kirjallisuudessa. Ensimmäiseksi dokumentoin yrityksen koon ja yrityskaupan koon olevan substituutteja toisilleen parinmuodostuksen määräytymisessä. Toiseksi todennan myöhemmän yrityskauppa-aktiivisuuden roolin parinmuodostuksessa. Kolmanneksi osoitan parhaiden investointipankkien markkinaosuudella ja markkinan yleisellä aktiivisuudella olevan yhteyden. Neljänneksi yhdistän parhaiden investointipankkien asiakkaiden laadun yleiseen yritysten laatuun markkinoilla.

AVAINSANAT

Investointipankki-toiminta, neuvonantopalvelut, yrityskaupat, parinmuodostus.

Table of contents

List of tables

1. Introduction

1.1 Background and motivation

Why did your father marry your mother? Why does U2 perform to sold-out stadiums? Why does Goldman Sachs frequent as an advisor to the largest firms in the most-high profile M&A transactions? Intriguing questions, indeed, but very much unrelated at a first glance. How could these seemingly unrelated conundrums possibly share a common denominator? The answer lies in the theoretical framework that has been used in economics to analyze the first two questions. They both involve matching of something; a man with a woman in the first question and a band with an audience in the second. Thus, the common denominator is matching. This thesis seeks to present a model to analyze the third question, namely that of matching an investment bank with a client, in the same theoretical framework that has been previously utilised with the first two questions. This approach implies viewing the association of firms and investment banks as a two-sided matching process, hence departing from the extant literature which has largely assumed an approach in which firms one-sidedly select their M&A advisors.

The prevailing setup in the literature has yielded studies which seek to explore the motivations behinds firm's choice of whether to employ an investment bank and which one. For instance, Servaes and Zenner (1996) present evidence that an investment bank – and more likely a prestigious one – is hired in deals with potentially high transaction costs, i.e. when banks may have an advantage in analysing the deal at a lower cost. Rau (2000) and Rau and Rodgers (2002), on the other hand, suggest that more prestigious investment banks are hired to ensure deal completion irrespective of the ensuing wealth creation to shareholders. Kale, Kini and Ryan (2003), however, find that, controlling for the advisor of the opposing side, employing a high reputation advisor in tender offers benefits shareholders in terms of wealth creation.

The setup of these studies is similar to those in a closely related field of finance research, namely that of the equity issue literature, where the prevailing approach has also been one where firms one-sidedly select the investment banks that underwrite their issues (see, for instance, Habib and Ljungqvist (2001) and Benveniste et al. (2003)). A notable exception in the equity issue literature is Chemmanur and Fulghieri (1994) whose model of the equity issue market results in underwriters selecting issuers. Still, their view is also one-sided albeit the selection is done by a different side than customary.

However, as stated above, this thesis assumes an alternative approach. One might argue that banks are free to choose who they offer their services to and, given the typically large number of potential clients, face the same kind of selection problem as firms choosing investment banks. This would imply a two-sided matching process which could be described as a broader assignment problem. Suggesting that banks are not simply chosen by their clients but that in a way clients are also being chosen by banks may at first blush seem outlandish as it is common knowledge that banks compete fiercely for advisory mandates and would hence appear to have little chance for selecting. However, investment banks have good reasons to be concerned with who their clients are and consequently seem to be active in the matching process as well.

For instance, the auction of AT&T Wireless in early 2004 featured multiple clients with whom Goldman Sachs had a relationship. Although it cannot be verified that Goldman Sachs specifically chose not to advise its long-standing client Vodafone (and not vice versa), the outcome turned out to be fortunate for Goldman Sachs. The firm it ended up advising in the auction, NTTDoCoMo, was on the selling side, and thus certain to complete the deal, while Vodafone eventually withdrew from the bidding contest and its advisor, UBS, missed the (typically high) fees contingent on deal completion. Anecdotal evidence from an industry source also suggests that banks do indeed evaluate the attractiveness of the potential clients who approach them[1]. This is natural since the profits of an investment bank are highly dependent on the characteristics of its clients and the transactions they seek to complete. For instance, McLaughlin (1990) reports that fees are significantly higher in completed deals. Furthermore, Saunders and Srinivasan (2001) document that investment banks are more likely to win mandates from firms with whom they have had dealings in the past and in addition earn higher fees from these mandates implying that more active clients are more lucrative.

Thus, credible evidence exists to support an inference that banks have an interest in the matching process, which hence seems more convoluted than one-sided selection would suggest. However, as noted earlier, the extant literature has not accounted for the possibility of an alternative two-sided matching process. This failure to view the matching process as a broader assignment problem may owe to the complexity of the issue but nevertheless has left an

[1] In a recent column a managing partner of a private equity fund describes how he was unable to hire a large investment bank to represent his fund in a bidding-contest because the bank suspected that his fund would be unwilling to bid aggressively enough to win the auction and complete the deal (Bataillon (2004)).

intuitively appealing approach unexplored, which moreover is backed by a firm theoretical foundation.

Standard economic theory would suggest that the market for M&A advisory services, like any other market, would clear on price. Service providers, investment banks in this case, would set their prices and firms demanding advisory services would evaluate the quality of services offered and prices asked by different banks and based on these choose which bank to employ. Equilibrium would be reached when all firms willing to hire a bank would have found one. However, an alternative way to clear the market is pointed out by Fernando, Gatchev and Spindt (2004). They note that when agents' characteristics are indivisible, as they very much are in the case of firms and investment banks, the association problem can be solved efficiently as a matching problem in which pricing is determined after the matching in a bargaining between the matched parties. This corresponds to assignment models (see, for instance, Roth and Sotomayor (1990)) in which agents from two disjoint sets form pairs and produce surpluses. Equilibrium is reached when the total surplus arising from all the matchings between agents from the disjoint sets is maximised. The wide applicability of assignment models has been proven by many studies (see, for instance, Becker (1973), Rosen (1981), Spurr (1987) and Fernando, Gatchev and Spindt (2004))

Therefore the approach assumed in this paper is one in which firms and investment banks solve a common assignment problem by associating by mutual choice. The solution to this problem is expected to determine the observed firm-investment bank pairs. Equilibrium solution to the assignment model stems from positive assortative matching.

1.2 Objective and contribution

This thesis has two objectives. First, the aim is to present a model for firm-investment bank matching and discuss its applicability to the market for M&A advisory services. Second, this thesis seeks to empirically examine the model and provide new evidence on the matching of firms and investment banks in M&A advisory.

The model presented is based on two-sided matching. This concept is not new to economics and has been used in the context of many phenomena, including, for instance, marriages (Becker (1973)) and more recently equity underwriting (Fernando, Gatchev and Spindt (2004)). In fact,

the model presented in this thesis is virtually identical in its notations with the model developed in the latter paper for equity issue underwriting services. Therefore, the contribution of this thesis lies not in developing a new model but in being first to apply such a model to, and adjusting it to suit, M&A advisory services. Consequently this thesis provides a new angle to the extant literature which has thus far largely assumed the matching to be one-sided. This leads to examination of issues that have previously been unexplored in the literature, including the role of subsequent M&A activity and the market share and client quality of high reputation investment banks.

However, it should be emphasized that this thesis does not seek to explicitly reject some other view, for instance a view based on one-sided selection. In fact, it would be extremely difficult to formulate hypotheses that would be able to differentiate between one-sided and two-sided matching. Still, casual experience and the views of practitioners would tend to suggest that the matching of firms and investment banks is better depicted by a two-sided rather than one-sided model.

Lending credibility to the model and contributing to the literature, by empirically examining implications of the model I'm able to report several findings that are consistent with the implications of the model and that, to the best of my knowledge, are new to the literature on M&A advisory services. First, while prior studies (see, for instance, Servaes and Zenner (1996) and Rau and Rodgers (2002)) have noted that more reputable investment banks advise big firms in large transactions, my observation that firm size and deal size are substitutes for each other in determining the observed firm-investment bank pairs has not been documented before. Second, the role of subsequent M&A activity as a determinant of firm-investment bank matching has not been examined in the literature before. Therefore my finding of subsequent M&A activity being a substitute for both firm and deal size is the first to show that subsequent activity does matter – a view that is commonly accepted among practitioners. Third, the model presented implies that high reputation investment banks should see their share of the number of firms in the market to shrink in a more active market, i.e. when there are more firms seeking advisors. While possibly counterintuitive at first, I document such a relation. Fourth, the model also yields implications on the relation of the quality of high reputation investment banks' clients and the overall firm quality in the market and, which I'm also able to confirm. Literature related to the last two findings is currently all but non-existing and therefore they significantly contribute to our knowledge on the dynamics of the market for M&A advisory services.

1.3 Limitations of the study

The theoretical framework applied in this thesis is new to the literature on M&A advisory services. Hence, it should be noted that the model presented in this thesis, and which is utilised in the analysis, may not correctly depict the nature of firm-investment bank matching process. Furthermore, as Kale, Kini and Ryan (1998) note, no rigorous theory exists for the role of investment banks in M&A. Therefore, by necessity, this thesis is of an experimental nature.

Some other caveats are also in order. First, the variables I use in testing empirically the model may be insufficient to capture all the elements and dimensions of the interplay between firms and investment banks. For instance, I do not control for the characteristics of targets. Second, for a substantial part of my sample some of the variables are not available and as a result tests are conducted with a limited sample. To the extent that data availability is related to firm/deal characteristics this may bias the results. Finally, the analysis is limited to acquirers and results and conclusions may consequently not be extendable to targets and their advisors.

1.4 Terminology

This thesis is about firms who seek to acquire other firms and about the investment banks that advise these acquirers. Therefore, if not explicitly otherwise stated, when talking about firms I refer to acquirers. Referring to these acquisitions, I use words deal and transaction interchangeably. These capture mergers as well as tender offers. For investment banks, I use words investment bank, bank and advisor interchangeably. Among the key concepts in this thesis are firm quality and investment bank ability. It should be noted that firm quality does not necessarily correspond to conventional notions of good or bad quality, but rather refers to the firm's contribution to the surplus arising from its match with an investment bank. If not explicitly otherwise stated, firm quality also captures the characteristics of the transaction that the firm seeks to complete in that specific context. Investment bank ability is defined similarly with reference to contribution to the surplus. Later it is assumed that this is increasing in the reputation of the advisor and thus quality, reputation and ability are used interchangeably for investment banks.

1.5 Structure of the study

This thesis is structured as follows. Section 2 introduces the theoretical framework of this thesis and related empirical evidence. Section 3 presents a model for firm-investment bank matching and discusses its applicability to the market for M&A advisory services as well as develops hypotheses based on the model. Section 4 describes the construction of the general sample and variables used in the empirical part. Section 5 provides the results. Section 6 concludes and suggests avenues for future research.

2. Theoretical framework and empirical evidence

This section lays out a theoretical foundation for this thesis by first giving an overview of matching literature and assignment models in particular. Next the role of investment banks in mergers and acquisitions and motives for employing investment banks are discussed and empirical evidence presented. The point of view of investment banks is also considered. A summary of the theoretical framework can be found in the end of this section.

2.1 Two-sided matching

2.1.1 Overview

As has been stated earlier, this thesis departs from the extant literature in viewing the association of firms and investment banks as a two-sided matching process rather than as a one-sided selection process with firms doing the selection. To lay a theoretical foundation for the former view, in what follows I will give a brief overview of matching theories and introduce assignment models, a subset of matching models. I will also present some examples of practical applications of assingnment models which are of particular interest from the point of view of this thesis. It is my intention to keep the discussion here rather non-technical and present the model used in this thesis in all its technicality in Section 3.1.

Roth and Sotomayor (1990) provide a fine review of two-sided matching models and I will largely follow their text here. First they note that in the context of matching the term "two-sided" refers to the fact that in these models agents come from two disjoint sets. Firms and workers are obvious examples of two disjoint sets. A firm cannot be a worker. Therefore both sets are important and matchings only occur between one or more agents from the opposite sets. Matching cannot occur within sets. Models where one agent is matched with one agent from the opposite set are often called marriage models as these models were first used to study the matching of men and women. Similarly, problems where one agent from one set is to be matched with several agents from the other set are often called college admissions problems following the problem setting in the seminal paper in matching by Gale and Shapley (1962). Given that this thesis deals with one-to-one matching, i.e. with a marriage model, one-to-many matching will not be discussed further.

Thus far it has been established that two disjoint sets of agents are needed and matchings occur between agents from these two sets. At this junction one might ask what determines the matchings that occur. Why is a given agent matched with a given agent from the opposite set? This indeed is the key question asked in matching theories. The answer lies in preferences. Assuming that the preferences of individual agents are complete and transitive, as is customary to assume in economics, their preferences will dictate the matching that occurs. However, an important point to note is that individual agents do not necessarily match with their most preferred agents from the opposite set. This is an essential element of the two-sidedness of the model. As Roth and Sotomayor (1990) note, in a marriage context no one can one-sidedly choose a spouse because marriage requires the consent of both parties. Therefore it is the interaction of preferences of the individual agents from the two sets that determine the matching that occurs rather than the preferences of any single agent.

Depending on the number of agents, there are multiple possible matchings that may occur. An important point to consider regarding these possible matchings is whether they are stable. This is a game theoretic concept and is pivotal in matching models. It is said that if a matching is not stable it will be blocked. This means that if there are two agents that are about to be paired with other agents but would both prefer pairing with each other, then the original matchings will not occur but will be blocked because a better combination can be found. Thus only matchings where neither agent can find a more preferred partner who is willing partner with them will not be blocked and survive.

The above presentation of two-sided matching is done in a simplistic manner. The issues dealt with are actually more complex and require higher math. Complicating matters include, for instance, possible frictions and the fact that agents may be heterogeneously informed about each others preferences, or may not be informed at all. However, for the purposes of this thesis the above presentation is sufficient. Still, I will next deepen the discussion somewhat by looking in a bit more detail into assignment models which are one form of general two-sided matching models. The model for firm-investment bank matching that is presented later in this thesis is essentially an assignment model.

2.1.2 Assignment models

The major distinction between assignment models and the general two-sided matching models described above is that in assignment models money (or some other commonly accepted explicit value metric) plays a role. Money is transferred between matched agents and sometimes even between unmatched agents or between agents within the same set. Furthermore, the preferences of individual agents are monetary in nature. The free transferability of money and the fact that preferences are monetary implies that no agent has strict preferences. This stems from the notion that by altering money transfers one can make two different matchings equally preferred, even though they might have been originally differently preferred. This is done by setting the monetary payoff of both equal.

The basic setting of assignment models does not differ greatly from the more general models discussed above. Agents are again assumed to come from two disjoint sets and matching occurs between sets but not within. However, associated with each matching is a surplus that is specific to the matched agents. This is where the (monetary) transfers come into picture. Namely, the two sides of the matching are free to divide the surplus arising from their match between them any way they like. In order to share the surplus, the side to which the surplus accrues to makes transfer payments to the other side. For instance, the surplus can be thought of as the productivity of a worker in a given firm and transfer payments are his or her salary from the firm. Given that there are multiple agents in both sets, there are also multiple different possible matchings which all have their own unique surpluses associated with them. This is presented below more formally with mathematical notations.

In the model that Roth and Sotomayor (1990) present there are two finite disjoint set of agents P and Q with m agents i and n agents j in the two sets, respectively. Associated with each possible matching (i, j) is a surplus S_{ij}. Therefore the possible mathings and the surpluses related to them form a matrix. This is shown for surpluses below; notation is modified from Becker (1973).

	Q_1	Q_2	$\cdots$	Q_n
P_1	S_{11}	S_{12}	$\cdots$	S_{1n}
P_2	S_{21}	$\cdots$	S_{ij}	$\cdots$
P_m	S_{m1}	$\cdots\cdots$	S_{mn}	

Arriving in stable matchings is a question of maximising the outcome of the surplus matrix above. Legros and Newman (2002) note that when agents' characteristics are complementary, implying that their joint output is a supermodular function of the characteristics, then there is positive assortative matching in a setting like this. Becker (1973) also makes the same point in his paper, although with different words. In essence this requires that a better agent from one set will always produce a larger surplus with any agent from the other set, i.e. surplus is monotonically increasing in the quality of both agents. For example, taking the first two columns and rows from the above matrix and assuming that the numbers denoted to P and Q agents represent rankings (with one being the highest ranking and two the second highest), positive assortative matching would stipulate that $S_{11} - S_{12} > S_{21} - S_{22}$. Reordering the terms, this is equivalent to $S_{11} - S_{21} > S_{12} - S_{22}$.

What this means in practice is that under positive assortative matching the first ranking agents from two disjoint sets will always form a pair, as will the second ranking agents and so on. This will be irrespective of their absolute quality. In the matrix context this implies that stable matchings will only occur on the diagonal and therefore any matching outside the diagonal will be blocked. Why this must be the case is shown below.

Consider the 2×2 matrix below, where the numbers denoted to agents represent rankings with one being the highest ranking and two the second highest.

	Q_1	Q_2
P_1	S_{11}	S_{12}
P_2	S_{21}	S_{22}

It was stated above that with a matrix like this positive assortative matching requires that $S_{11} - S_{12} > S_{21} - S_{22}$. Reordering the terms, it can be seen that this is equivalent to $S_{11} + S_{22} > S_{21} + S_{12}$. Thus, as optimal solution warrants maximizing the combined surplus, in equilibrium P_1 agent will match with Q_1 agent and P_2 agent will match with Q_2 agent. On a more general level this example shows that, assuming positive assortative matching, in equilibrium matchings will only occur on the diagonal.

Above has been described the underlying concept of assignment models. I will next turn to their practical applications.

2.1.3 Applications

Assignment models are rich in applications. They can be utilised in studying a wide range of problems which involve pairs producing an output with monetary (or some other commonly accepted) value. In what follows, I will present just few examples but with these examples seek to demonstrate the wide applicability of assignment models. The last one of the examples is of particular relevance, as it is largely in the spirit of that study that the model and empirical part of this thesis are constructed.

Perhaps one of the better known papers in economics is Becker's (1973) theory of marriage in which he analyses what he calls the marriage market and the matching of men and women. He begins by stating that each household (matchings are referred to in Becker (1973) as households) produces household commodities, which include, for instance, the quality of meals, the quality and quantity of children, prestige, recreation, companionship, love and health status. However, a simplifying assumption is made that all household commodities can be combined to a single aggregate. This is the output of the household. Another way to view this output is to consider it as the surplus discussed above in the context of assignment models. Becker (1973) goes on to assume that each person tries to do as well as possible and shows that the marriage market is in equilibrium when the household commodity output of all households is maximised.

Given these assumptions, it is fairly easy to see how he arrives in employing an assignment model to analyse the marriage market. The setting he lays out is similar to the basic setting of assignment models in that it involves matching of agents from two disjoint sets and they produce a surplus that is divided between them. Moreover, equilibrium is reached when the total output of all matchings is maximised. One implication of the model that Becker (1973) presents is that men differing in physical capital, education, intelligence, height, race and many other traits will tend to marry women with like values of these traits. This feature of marriages appears to be consistent with casual experience.

Slightly less sensationally, the area of research where assignment models have been utilised most extensively is still labour economics. Their use in labour economics dates all the way back to articles by Tinbergen (1951) and Roy (1951). In this context assignment models typically involve workers and firms or workers and resources. These models have proven particularly useful in studying income distribution. Interested reader is advised to see Sattinger (1993), who provides an excellent survey of the classic references and more recent literature in this topic, as my intention here is to provide a limited overview.

An important idea in the context of assignment models and labour economics that is worth highlighting here is so called scale of resources effect. This stems from the idea that in order to maximise output scarce resources should be allocated to the most productive use. The basic implication of this idea is that more able (i.e. more productive) workers will match with more work and resources. For instance, a good thesis instructor will (or at least should) be found instructing more students. Similarly good managers should be found in charge of larger entities. Rosen (1981) applies this idea to the phenomenon of superstars, as he calls it. The analytical framework he uses is a special type of assignment problem, the marriage of buyers to sellers. He shows that his analytical framework can be used to explain, for instance, why better artists perform to larger audiences and why better lawyers are more frequently found in larger cities. Thus, referring to one of the questions in the beginning of this thesis, assignment models also explain why a certain Irish band tends to put up its show for stadium-sized audiences.

Spurr (1987) studies lawyers and law firms - an area which has some parallels with investment banking. He points out that according to the scale of resources principle better lawyers should be given more legal work. However, he goes on to note that there are certain fixed costs related to handling all legal claims, regardless of their size. For example, all relevant documents must be obtained, the client met and facts discussed no matter what the size of the claim is. Therefore the most effective way to give more legal work to a better lawyer is to give him larger legal claims, i.e. legal claims where more money is at stake. One should note that the argumentation above of fixed costs regardless of the size of the claim would appear very much apply to M&A advisory as well. There are certain tasks that need to be completed regardless of the size of the M&A transaction.

Spurr (1987) has information on the clients of a set of lawyers as well as information on the law schools which the individual lawyers attended and on their rankings within that law school. The

latter two are used to proxy for lawyer quality. He finds strong evidence of positive assortative matching, i.e. better lawyers are associated with larger legal claims. This is consistent with scale of resources effect. Unsurprisingly, he also observes that law firms vary greatly in the size of the legal claims they handle. Therefore initial matching occurs when students leave school, with high quality students matching with the most prestigious law firms, who handle the largest claims. Sorting continues within firms with only the best lawyers reaching a partner position.

Fernando, Gatchev and Spindt (2004) study the equity issuance market. More specifically, they are interested in how issuers and underwriters match in equity issues and SEOs. While standard economic theory would suggest that the market for underwriting services would clear on price, i.e. underwriters would set their prices and issuers select underwriters after observing the prices asked, they note that when agents' characteristics are indivisible, as they are in the case of issuers and underwriters, the association problem can be solved efficiently as a matching problem in which pricing is determined after the match in a bargaining between the matched parties. This point of indivisibility of characteristics leading to an assignment model is also made by Roth and Sotomayor (1990). Fernando, Gatchev and Spindt (2004) develop an assignment model for the association of issuers and underwriters in the market for underwriting services and test it with a rich set of over 13 000 equity offerings from 1970-2000. The model presented later in Section 3.1 is based on this model.

Empirically Fernando, Gatchev and Spindt (2004) find strong support for their model. Better investment banks are associated with larger issues and with larger clients. Investment bank ability is also positively related to other measures of firm quality, such as age and positive earnings. This is consistent with positive assortative matching and hence implies that issuer and underwriter characteristics are complementary. Fernando, Gatchev and Spindt (2004) also develop additional hypotheses based on their model related to, for instance, underwriter market shares, spreads and issuer quality. All these additional hypotheses are lent credibility by the results. Thus, an assignment model appears to perform rather well in predicting the association of issuers and underwriters in the market for underwriting services.

2.2 The role of investment banks in M&A

2.2.1 Overview

The discussion above introduced the concepts of surplus and transfer payments. An important issue to ponder is what constitutes these in the context of M&A advisory. I will next discuss the role of investment banks in mergers and acquisitions and consider functions performed by investment banks. These can be seen as contributing to the surplus.

There is a plethora of theoretical papers examining financial intermediaries (see, for instance, Leland and Pyle (1977) and Campbell and Kracaw (1980)). The role of financial intermediaries as advisors has received attention mostly in the area of capital issuance. In capital issuance the role of investment bank advisors is often related to the resolution of information asymmetry as market participants are assumed to be differentially informed about the value of the securities that are being marketed. In such a setting investment banks engage in information gathering and production in order to accurately value securities. A theoretical paper by Chemmanur and Fulghieri (1994) shows that investment banks have an incentive to engage in the above mentioned activities, although doing so entails a cost to them as the costs are outweighed by the benefits that are related to acquiring reputation capital. Reputation capital is valuable as investment banks come repeatedly to the market to offer their services.

Despite many studies examining empirically investment banks' involvement in mergers and acquisitions, there is actually no rigorous theory outlining the role that investment banks that play in M&A. This is likely to owe to the more convoluted nature of investment banks' role in the market for corporate control relative to capital issuance. As Kale, Kini and Ryan (1998) note, M&A provides a more complex setting than capital issuance due to at least to the following institutional features of takeovers:

- Both the target and the acquirer are at least partially informed
- The advisor performs multiple functions for the client
- The opposing party in the contest may also utilise the services of an advisor

Therefore not only is there more involved than just information asymmetry but also the information asymmetry is of a more complex kind. Target is probably best informed about its

own value but the acquirer, on the other hand, might posses the best information about the synergies related to the transaction and hence be in better position to value the combination.

Given the scarcity of established theories, I'm unable to provide here a commonly accepted theoretical framework for investment banks' role in M&A simply because no such thing exists. However, as a theoretical framework is still needed to guide and structure the discussion that follows, I will rely on the framework for investment banks' role in M&A suggested by Servaes and Zenner (1996). They propose that there are three functions that investment banks serve in acquisitions; reduction of transaction costs, reduction of information asymmetry and reduction of contracting costs. I will discuss each of these next and introduce related empirical evidence. I will also present an overview of the existing evidence on whether investment banks create any value for their clients and introduce an additional role that has been suggested for investment banks in the M&A context.

2.2.2 Reduction of transaction costs

The motivation behind the transaction costs argument lies in a paper on financial intermediation by Benston and Smith (1976). As an example, they note that the most basic form of financial intermediary is a market maker who simply provides a physical location for buyers and sellers to meet. A bit more sophisticated form is represented by a dealer who takes a position at his own risk in the asset that is being transacted. In both cases an individual would incur significantly higher transaction costs should he or she try to find a counterparty and execute the transaction on his or her own compared to the transaction being materialised through a financial intermediary. This notion of higher transaction costs is also applicable to more advanced forms of financial intermediary, such as banks. Hence Benston and Smith (1976) go on to argue that that the main reason for the existence of financial intermediaries is transaction costs. Financial intermediaries exist because of their ability to reduce transaction costs.

In their analysis, Benston and Smith (1976) view the role a financial intermediary as producing financial commodities which can be used to effect consumers' inter-temporal, intra-temporal and state determined consumption decisions. Producing these commodities entails costs but these costs are lower than the transactions costs that an individual would incur without financial intermediaries. More specifically, Benston and Smith (1976) identify three reasons why

financial intermediaries have a comparative advantage in producing these financial commodities:

1. Economies of specialization
2. Scale economies in information production
3. Reduction in search costs

While the analysis in Benston and Smith (1976) is mostly limited to financial intermediaries producing financial commodities for consumers, Servaes and Zenner (1996) suggest that it can be extended to explain the use of investment banks in acquisitions. This seems plausible, as one, simple, way to view investment banks role in acquisitions is that of a market maker. Investment banks can be seen as operating between buyers (acquirers) and sellers (targets) in the market for corporate control. In an M&A framework Benston and Smith's (1976) arguments would thus suggest that investment banks are used because they are able to perform the tasks that are required to bring an acquirer and a target together at a lower cost than what the individual firms would incur in doing so by themselves.

What are the tasks that need to be performed in bringing an acquirer and a target together, then? From an acquirer's perspective Servaes and Zenner (1996) name identifying and valuing a target and putting together a bid. Not limiting the discussion to acquirers, Kale, Kini and Ryan (2003) point out firstly identifying potential targets (bidders), evaluating stand-alone and combined values and proposing methods for obtaining synergies. Secondly, they point out advice on strategic activities. From an acquirer's perspective these might include designing an offer so as to ensure a low price and from a target's perspective utilising takeover defence methods and identifying potential alternative suitors.

It would seem reasonable to conjecture that investment banks have a comparative advantage in performing the above mentioned tasks. First, related to identifying counterparties, investment banks follow a broad universe of companies being therefore likely to be better able to locate counterparties. It is also commonly known that investment bankers maintain continuous dialogues with several companies learning in the process about the intensions of these companies. This enables banks to act as sort of market makers in the market for corporate control as they possess non-public information about interested buyers and sellers thus further reducing search costs.

Second, related to the other tasks that need to be performed, investment banks are again likely to be well placed relative to firms. This stems from both economies of specialization and economies of scale in information production which both are likely to arise in investment banking. By repeatedly working in corporate takeovers and mergers investment banks acquire knowledge and skills which can be re-employed in future takeover and merger situations at a low cost. For instance, the same valuation model can be utilised to value multiple companies in the same industry or in similar industries. Similarly, the same contract models can be used with little modification in multiple takeovers. This appears to be also recognised by practitioners[2].

Following from the reduction in transaction costs argument, Servaes and Zenner (1996) hypothesise that investment banks are used in more complex transactions the rationale being that transactions costs are likely to be higher in these transactions. Their proxies for complexity are whether the deal was hostile, whether it involved at least some securities as a form of payment, whether the acquirer was not the first bidder and the size of the transaction They also hypothesise that investment banks are more likely to be used in transactions where the acquirer has little prior acquisition experience since in these instances the acquirer is unlikely to have set up a separate in-house M&A group to reduce transaction costs.

Servaes and Zenner (1996) find support for their hypothesis. In their sample, which consists of 176 US takeovers from 1981 to1992, acquirers are more likely to use investment banks when the acquisition is hostile and less likely when the payment method is not cash only and when the acquirer has less prior acquisition experience. Their other proxies are not statistically significant. Servaes and Zenner (1996) also test whether transaction costs are related to the reputation of the investment bank that is hired. They report some evidence in support of this. First-tier rather than second-tier bank is hired when the acquirer has less prior acquisition experience lending some credibility to an argument that a more reputable bank is hired in the presence of higher transaction costs.

The findings of Rau and Rodgers (2002), on the other hand, suggest the opposite. In their sample of 223 US tender offers from 1980 to 1994 they report that less rather than more reputable investment bank is likely to be hired when the deal is complex. However, in their

[2] A partner responsible for transaction services at a leading consultancy recently noted in Financial Times that "It would not make economic sense for companies to permanently employ the volume and breadth and breadth of specialists that would be necessary to conduct major transactions without external support" Saigon (2004).

paper complexity is proxied by several measures related to difficulty of valuing the target. In Servaes and Zenner (1996), on the other hand, the difficulty of valuing the target is related to information symmetry. It is true that information asymmetry can be seen as a part of transaction costs – a point Servaes and Zenner (1996) do not shy away from noting – but in their paper they treat it separately as they argue it to be unique in nature when compared to the transaction costs discussed above. I will discuss the Servaes and Zenner (1996) view on information asymmetry next.

2.2.3 Reduction of information asymmetry

The second reason for investment banks involvement in M&A that Servaes and Zenner (1996) suggest is the existence of information asymmetry. We have already encountered information asymmetry and investment banks in the context of equity issues. In equity issues investment banks alleviate information asymmetry related to the fair value of the securities that are being issued and marketed to the general public. Market participants are heterogeneously informed about the value of the company and thus uninformed participants are reluctant to purchase securities if their value is not certified by a credible intermediary. Therefore, in order to secure demand for the issue, the issuer hires an investment bank which expends resources and uses its expertise to value the securities. Uninformed market participants are then willing to purchase these securities as their value is deemed to be fair given the fact that is has been certified by an investment bank.

While investment banks might be tempted to cheat by allocating limited resources to the valuation, and hence increasing their short-term profits but also increasing the likelihood of misvaluations, Chemmanur and Fulghieri (1994) show that investment banks have an incentive to acquire a reputation for veracity as they come repeatedly to the market to provide valuations. If these valuations are not perceived as trustworthy by market participants, as would be the case when the valuations of a particular investment bank commonly exhibited deviations from the (ex-post observable) fair value, investment bank loses its ability to act as a credible certifier of value and the demand for its services by issuers disappears. Therefore investment banks engage in considerable efforts in order to correctly value securities.

Chemmanur and Fulghieri (1994) suggest that their model is also applicable to investment banks producing information about the target firms in corporate takeovers. Indeed, in takeover situations there is asymmetric information about the value of the target as the target is likely to be better informed about its own value than the acquirer. Therefore the acquirer runs a risk of paying a too high price for the target. This risk can be mitigated by hiring an investment bank that uses its resources to value the target. The investment bank has an incentive to expend enough resources as to provide an accurate valuation as its ability to do repeat business is related to the accuracy of its valuations.

A question that might arise at this point is that if investment banks are hired by acquirers to value targets, why do targets hire investment banks? Indeed, the discussion in Servaes and Zenner (1996) is from acquirer's perspective and does not mention target or its advisor. However, as Kale, Kini and Ryan (1998) note, there is also likely to be asymmetric information about the value of the acquirer and about the value of the combination. The former is of importance for the target when the payment for the acquisition is in the form of acquirer's shares. The latter is of importance regardless of the payment method. This is because the price that is paid for the target typically includes a premium to the target's stand-alone value. This premium is motivated by the synergies that are created by combining the acquirer and the target. Therefore the premium effectively dictates how the value created by combining the two companies is shared between the acquirer and the target. From this it follows that the target should be interested in the value of the combination, which might be better known by the acquirer and its advisor, in order to make sure that it receives its fair share of the synergies. In order to level the playing field in this respect, the target may therefore wish to employ an investment bank for valuation purposes to alleviate the information asymmetry related to synergies.

Servaes and Zenner (1996) hypothesise that the degree of information asymmetry is related to the decision of whether to employ an advisor or not. They proxy information asymmetry by the relatedness of the industries in which the acquirer and target operate, by whether the acquisition is a complete takeover or an acquisition of assets or an acquisition of a partial ownership interest, by the number of industries in which the target operates and by whether the eventual acquirer was the first bidder. Their results are somewhat controversial. Only two variables are significant. Consistent with their hypothesis, firms are more likely to use an investment bank if the target operates in several industries. However, contrary to their hypothesis, firms are less

likely to use an investment bank in acquisitions of assets. Servaes and Zenner (1996) had hypothesised that the relation would have been positive as there is less information available for specific assets than there is for whole companies. While there might be some merit to this argument, it is normally the case that the seller of a specific asset seeks to provide sufficient information about the asset for prospective buyers to ensure their interest. Therefore the information asymmetry related to assets may not, after all, be that much greater than the information asymmetry related whole companies. However, this still does not explain the statistically significant negative relation.

Servaes and Zenner (1996) also investigate the relation of information asymmetry and the reputation of the investment bank that is hired but fail to document any significant results. As discussed earlier, investigating proxies that in the Servaes and Zenner (1996) framework are related to information asymmetry, Rau and Rodgers (2002) do not find evidence of more reputable banks being hired in (more complex) transactions where the degree of information asymmetry is likely to be high. In fact, their results point to the opposite direction. They report that firms are more likely to hire a less reputed investment bank in the presence of high degree of information asymmetry about the value of the target.

2.2.4 Reduction of contracting costs

The third role of investment banks in Servaes and Zenner (1996) is related to contracting costs. Stemming from the notion in equity issue literature (see, for instance, Smith (1986) and Titman and Trueman (1986)) that investment banks provide a signal of firm quality for investors, Servaes and Zenner (1996) argue that investment banks have a monitoring role in acquisitions. In equity issues the incentive for investment banks to engage in monitoring activities is motivated by the fact that banks are liable for misrepresentations in the prospectus. In addition, investment banks have an incentive to preserve their reputation capital as discussed above in relation to asymmetric information and performing valuations.

For investment bank advisors in acquisitions there is not as strong legal imperative as with equity issues to engage in monitoring activities. However, the incentive related to the reputation capital argument above is just as strong in acquisitions as it is in equity issues. Servaes and Zenner (1996) argue that the value of investment bank's reputation capital depends on the

quality of its advice. This, in turn is related to the performance of its clients. Therefore investment banks have an incentive to monitor their clients. Should client wish to pursue a value destroying acquisition, it would be in the best interest of the investment bank to advise against completing such an acquisition or, alternatively, to decline to act as an advisor in such a deal. Thus, investment banks act as certifiers of deal quality by monitoring their clients.

Servaes and Zenner (1996) hypothesise that the need for monitoring is greater for firms with potentially high agency problems. This is natural since if the interests of the management and shareholders are not aligned, then there is a danger of the management engaging in acquisitions which are not in the best interest of the shareholders. It is against this that the monitoring services are required. Agency problems are proxied by the percentage of the company owned by insiders and by the percentage of non-management members in the board. Servaes and Zenner (1996) also hypothesise that the need for monitoring is greater when information about the market price of the target is readily available since in these instances the likelihood of the management overpaying is higher as only the valuations that exceed the current market price lead to bids.

Testing their hypotheses, Servaes and Zenner (1996) fail to find credible support for the argument that contracting costs would be driving the decision of whether to employ an investment bank advisor or not. Similarly their findings regarding whether contracting costs are related to the reputation of the investment bank that is hired do not lend credibility to a conjecture that contracting costs would play a role in the hiring of an advisor.

Rau and Rodgers (2002) tackle the contracting costs argument in a similar manner, but include certain additional control variables. Most importantly, they control for the size of the acquirer. This is meaningful as some of the other variables which are used to proxy, for instance, agency problems might be related to firm size. To give an example, Rau and Rodgers (2002) note that if managers are capital constrained (which they most likely are) then insider ownership is likely to be lower in large companies since the cost of acquiring a given percentage stake is directly related to the value of the firm.

Controlling for the size of the firm, Rau and Rodgers (2002) reach statistically significant results. Their results do indeed show that more reputable investment banks are hired in the presence of potential agency problems. More specifically, in their sample more reputable

investment banks are hired by acquirers with larger boards of directors, less concentrated equity ownership and less insider ownership.

Allen, Jagtiani, Peristiani and Saunders (2003) also find evidence on investment banks having a certification role in M&A. They observe that advisors who have been in a position to gather private information about their clients through a lending relationship are better able certify the value of a target. Targets that employ such advisors enjoy higher returns than those who employ unrelated advisors.

2.2.5 Value creation

While the above discussion has concentrated on describing the different roles that investment banks may serve in acquisitions, an interesting point to consider is whether these activities create any value for clients. Furthermore, from the point of view of this study it is of importance also to consider whether the possible value creation is related to investment bank reputation. Given that the most reputable investment banks charge enormous fees for their advisory services, it is not surprising that especially the latter point has been closely scrutinised by academics. The question scholars have put forward is whether the premium fees charged by the most reputable investment banks are merited by the quality of their advice with quality in this context referring to shareholder value created as a result of M&A.

An important point that one must bear in mind when going over the existing empirical evidence is that value creation in a given transaction may refer to three different things. First, it may refer to the change in acquirer's market capitalization. Second, it may refer to the change in target's market capitalization. Third, it may also refer to the change in the combined market capitalization of the two aforementioned parties. Thus, a deal might be considered value creating even if the change in the acquirer's market value is negative. Investigating the relationship between value creation and investment bank reputation is further complicated by two institutional features of M&A. First, the value created in a transaction is divided between the two opposing sides but the division need not be, and hardly ever is, even. Second, given this adversarial nature of M&A both sides may employ advisors to gain advantage over the other but the advantage gained by employing an advisor might be limited by the fact that the opposing side is employing one as well. Therefore, even if a firm engages in a deal that is value creating

and employs a high reputation advisor to gain advantage in negotiations over the division of the value created, the outcome may be unfavourable as the opposing side may employ an advisor of even higher reputation which uses its negotiation skills to ensure that its client receives the bulk of the value created by the deal. I will next go over the findings of the most relevant papers that deal with investment banks and value creation in M&A.

Bowers and Miller (1990) investigate the value of investment banking function in M&A by examining the returns earned by acquirers and targets. Drawing their sample from 600 completed US acquisitions between 1981 and 1986, they seek to observe whether the change in the market capitalization of the acquirer or the target is related to investment bank choice and whether the change in the combined market capitalization of the two sides is related to the choice of the investment bank. Bowers and Miller (1990) divide investment banks into two tiers and use this division as a measure of investment bank quality. In their study first-tier banks include First Boston, Goldman Sachs, Merrill Lynch, Morgan Stanley and Salomon Brothers. Of the 228 firms in their final sample, 131 employed first-tier investment banks and the rest second-tier investment banks.

The results presented by Bowers and Miller (1990) suggest that first-tier investment banks are better in detecting firms with whom an acquisition would result in greater economic benefits. They find that in transactions where either the acquirer of the bidder employ a first-tier investment bank the total change in the market capitalizations of the two sides is greater than when neither side employs a first-tier bank. However, there is no evidence that employing a first-tier investment bank brings superior bargaining expertise to acquisition negotiations as for bidders there is no significant difference between firms that employ first-tier banks and firms that employ second-tier banks. For targets, there appears to be a positive relationship between investment bank quality and the portion of the abnormal dollar return related to a transaction that accrues to the target but Bowers and Miller (1990) attribute this finding to the tendency of first-tier banks to act as advisers in transactions that are create more dollar wealth in the first place. Therefore they conclude that while first-tier banks seem to identify better mergers in terms of the total value created, they do not seem to bring any advantage to negotiations over its division.

Michel, Shaked and Lee (1991) evaluate the acquisition advice of different investment banks in US over the period 1981-1987. Their sample consists of 203 firms of which 122 are acquired

and 81 are acquirers. They include six investment banks (Goldman Sachs, Morgan Stanley, First Boston, Lehman Brothers, Salomon Brothers and Drexel Burnham Lambert) individually in their study and use category "other" for the rest. They consider the six banks included individually to have been the major investment banks over their sample period. Note that Drexel Burnham Lambert's legal troubles and subsequent bankruptcy took place after the sample period. Michel, Shaked and Lee (1991) are interested in both premiums paid by acquiring firms and rates of return accruing to acquirers as a function of their investment bankers.

The results are somewhat surprising in the sense that Drexel Burnham Lambert, a less prestigious bank compared to most other banks in the sample, outperformed others in providing bid advice to client firms. More specifically, the firms that Drexel's clients target earn the lowest CARs relative to other targeted firms in the sample. To put this differently, Drexel's clients pay the lowest premiums for their acquisitions. This result is consistent over the entire sample period. Turning to evidence relating to the returns accruing to acquirers, however, the conclusion about Drexel's superiority does not receive unambiguous support. Measuring acquirer returns two weeks after the acquisition Drexel dominates only First Boston and using shorter time intervals there is no evidence of Drexel dominating any bank. Separately, First Boston's clients appear to enjoy lowest returns related to acquisitions. Taken together, Michel, Shaked and Lee (1991) interpret their evidence as contradicting the conclusion reached by Bowers and Miller (1990) that investment bank prestige and quality of advice measured by value creation are positively linked. It is especially the observation that Drexel Burnham Lambert, a relatively less prestigious bank, appears to do well in their sample that supports this conjecture. However, Michel, Shaked and Lee (1991) willingly point out that due to limited data their findings should be considered only preliminary.

Servaes and Zenner (1996) also investigate value creation and the choice of investment bank but only limit their analysis to comparing transactions were an advisor was used to transactions were no advisor was used. Their sample consists of the 99 US acquisitions over the 1981 to 1992 period that were listed in the Mergers & Acquisitions magazine as having been completed without an advisor and of 198 randomly selected acquisitions over the same period were an advisor was listed in the magazine. The authors examine cumulative abnormal returns of the acquirer and the target and also the total cumulative abnormal returns of the combination.

In a univariate comparison Servaes and Zenner (1996) observe that acquirers advised by investment banks earn significantly smaller returns than acquirers that use in-house expertise. Targets, on the other hand, earn higher returns when they employ an investment bank and the total return of the combination is also higher if an investment bank is employed. However, the last two results are not statistically significant. When the authors control for the determinants of investment bank choice, which they investigate earlier in their study, they find that the statistically significant difference between investment bank advice and in-house advice observed in a univariate framework no longer holds in a multivariate framework. The sign of investment bank dummy is actually positive but not statistically significant. Servaes and Zenner (1996) therefore conclude that there is no difference in returns between companies that employ an investment bank and companies that rely on in-house corporate finance knowledge.

Rau (2000) investigates, among other things, whether clients of more reputable investment banks earn higher announcement-period returns than clients of less reputable investment bank. His sample is drawn from Securities Data Corporation's Mergers and Corporate Transactions database and covers the period from January 1980 to December 1991. Investment bank reputation is measured by dividing the banks into three tiers. The tiers are formed by first ranking each investment bank every year from 1980 to 1994 on the basis of the value of transactions advised during the year and secondly by calculating an average of these rankings for each investment bank. Bulge bracket, i.e. first-tier, investment banks are the first five banks measured by this average. Major bracket, i.e. second-tier, investment banks are the ones with average rankings between 6 and 20. The rest are classified as third-tier banks.

Rau (2000) finds that in all three time windows he uses, acquiring firms in mergers advised by first-tier banks earn lower returns than either second- or third-tier banks. Furthermore, it is clients of third-tier investment banks that appear to enjoy the highest returns of all the banks. A Wilcoxon rank sum test rejects the hypothesis that the returns are identically distributed in any of the three time windows. However, in tender offers acquirers advised by first-tier investment banks earn significantly higher returns than those advised by either second- or third-tier investment banks. This finding is given statistical credibility by a Wilcoxon rank sum test which again rejects the hypothesis that that the returns are identically distributed in any of the three time windows used. In addition, Rau (2000) investigates whether there's a difference in the proportion of value creating transactions that different investment banks complete. He defines value creating transactions as one in which the announcement period return of the acquirer is

positive as opposed to value destroying transactions in which this measure is negative. He finds that first-tier investment banks are no more likely than other banks to complete value creating transactions. Rau (2000) interprets his evidence as providing little support for the hypothesis that clients of more reputable investment banks would enjoy higher returns and concludes that the market share of an investment banks seems to be driven more by deal completion than by value creation.

As part of investigating why top-tier investment banks are hired to advise bidders in tender offers Rau and Rodgers (2002) examine announcement and long-term returns earned by bidders and try to relate these to the tier of the advisor. Their sample consists of 223 US tender offers announced between January 1980 and December 1990. Investment banks are divided into tiers according to the method in Rau (2000).

In a univariate framework Rau and Rodgers (2002) do not find announcement period returns differing between firms advised by investment banks from different tiers. However, when they investigate returns earned over the 36 month period following the acquisition they observe clients advised by first-tier investment banks enjoying lower returns. In fact, clients of first-tier investment banks earn on average a slightly negative return while clients of second-tier banks earn 11% and clients of third-tier investment banks earn 30% in the three years following the acquisition. A Wilcoxon rank sum test rejects the hypothesis that the returns in these three categories would be identical at the 10% level.

Rau and Rodgers (2002) also investigate announcement period and long-run returns in a multivariate framework. They do this in order to control for deal characteristics that may alter the returns of the acquiring firm. For instance, companies that are prone to agency problems may be discounted when they pursue acquisitions as their acquisitions are more likely to be motivated by empire building of the management or by other reasons that do not benefit shareholders. Controlling for deal characteristics, Rau and Rodgers (2002) again find that announcement period returns are not related to the tier of the investment bank acting as an advisor. Investigating returns in the three years following the acquisition they observe that the tier of the investment bank is positively related to the return earned by the client, i.e. clients of less reputable investment banks earn higher returns following the acquisition. This result is also statistically significant. Rau and Rodgers (2002) also find that first-tier investment banks are hired by companies where managers' and directors' incentives are poorly aligned with

shareholders, which leads them to conclude that first-tier investment banks appear to be hired not to create shareholder value but to ensure that other objectives of the management are met.

Finally, Kale, Kini and Ryan (2003) also investigate value creation and investment bank involvement in corporate takeovers. However, their methodological approach departs somewhat from previous studies. Most importantly, they recognize the fact that the division of synergies resulting from combining two firms is determined in a bargaining between the two sides and therefore one must account for the characteristics of the opposing side as well. This relates to a point that has been discussed earlier in this Section. That is, employing a high reputation adviser may give no advantage in negotiations over the value created by the transaction if the opposing side is employing an advisor of even higher reputation.

As Kale, Kini and Ryan (2003) point out, this last point is that something previous research has failed to consider. Failing to take it into account may well distort the results reported in previous research as it would seem likely that high reputation advisors often find another high reputation advisor sitting on the other side of the negotiation table thus diluting their potential advantage. More specifically, in their paper Kale, Kini and Ryan (2003) tackle this issue by creating a measure of relative investment bank reputation, which they use in their empirical tests. That is, they do not measure the reputation of an advisor in a given transaction in absolute terms but as relative to the reputation of the advisor of the opposing side of the transaction.

Kale, Kini and Ryan (2003) draw their sample from US takeovers between 1981 and 1994. They identify 390 takeover contests that have sufficient data for their empirical tests. Of these contests 352 were successful and 38 unsuccessful. As mentioned above, they measure investment bank reputation in relative terms. However, in order to do this they must first calculate absolute values for reputation. The proxy that they use for reputation is the market share of the respective advisor in the year of the takeover. This is calculated by first determining the total dollar flow of all transactions in that year and by then computing each advisor's share of this amount. The relative reputation of an advisor in a given deal is given simply by dividing the absolute reputation of that advisor by the absolute reputation of the advisor of the opposing side.

The results of Kale, Kini and Ryan (2003) indicate that retaining a high reputation advisor provides benefits for the client. First, consistent with Bowers and Miller (1990) they find that

high reputation advisors are associated with more value creating transactions. Both the relative reputation of bidder's advisor and the relative reputation of target's advisor are positively related to the combined wealth gain of bidder's and target's shareholders. Second, they observe that for both bidders and targets the shareholder value created by a transaction is higher the higher the relative reputation of their advisor is. Third they document that employing a high reputation advisor brings an advantage to the negotiation table in the sense that the higher the reputation of bidder's advisor relative to that of target's the higher the share of the value created by the combination that accrues to the bidder.

Kale, Kini and Ryan (2003) note that their results depart to some extent from those reported by Bowers and Miller (1990) and clearly from those reported previously by Servaes and Zenner (1996) and Rau (2000), who all fail to document benefits from employing a high reputation advisor. They suggest that this is because in the aforementioned papers either the reputation of target's advisor is not considered at all or the reputation of bidder's advisor and the reputation of target's advisor are entered separately into the analysis. However, given the adversarial nature of takeovers, it is important to consider both of them simultaneously as it is more their interplay than the absolute value of either one that determines the value creation accruing to a given side of the merger. Thus Kale, Kini and Ryan (2003) conclude that controlling for the advisor of the opponent, there are clear benefits in employing a high reputation advisor.

2.2.6 Deal completion

Given that, with the exception of Kale, Kini and Ryan (2003), the empirical research on investment bank involvement in corporate transactions has failed to report any benefits in terms of value creation from retaining a high reputation advisor, scholars have been facing a puzzle. Namely, why do firms employ high reputation advisors and pay their premium fees if these investment banks are unable to deliver any value to shareholders? To solve this conundrum, some researchers have suggested that the role of investment banks in M&A is not to ensure value creation but rather to ensure that deals are completed. This suggestion receives support from the observation that investment banks often face strong incentives in their fee structures to complete deals.

Investigating the determinants of the market share of investment banks acting as advisors in M&A, Rau (2000) reports that high reputation banks complete a higher portion of the deals in which they have an advisory role. Furthermore, the market share of an investment bank is significantly related to the number of deals it has completed in the past. Rau (2000) concludes that his findings are consistent with a deal completion hypothesis which posits that high reputation investment banks are not hired to find and execute better deals but to ensure that deals are completed.

Rau and Rodgers (2002) examine the same issue. Similarly, they find that deals advised by high reputation investment banks are more likely to be completed. They also note that clients of first-tier banks are characterized by the potential for large agency costs as these companies have larger boards of directors, less concentrated equity ownership and less insider ownership. While the latter observation may also be due to companies suffering from agency problems hiring high reputation investment banks for certification purposes, Rau and Rodgers (2002) argue that their results are more consistent with the deal completion hypothesis.

Kale, Kini and Ryan (2003) also address the issue of deal completion. While their results are consistent with Rau (2000) and Rau and Rodgers (2002) in the sense that they find high reputation investment banks completing higher percentage of deals in which they have an advisory role, they also report results that suggest that high reputation investment banks are not motivated simply by deal completion as the deal completion hypothesis would suggest. More specifically, Kale, Kini and Ryan (2003) observe that in multibidder contests clients of more reputable investment banks are more likely to withdraw from, i.e. not complete, acquisitions that resulted in value destruction for the eventual acquirer but at the same time are more likely to complete deals that resulted in value creation for the acquirer. These results are contradictory to the deal completion hypothesis and lead Kale, Kini and Ryan (2003) to conclude that investment banks do indeed seek to act in the best interest of clients' shareholders.

2.2.7 Services beyond the present deal

So far the discussion has concentrated on services that investment banks provide in the context of a specific deal. As has been discussed above, these services may include, for example, identifying a target, valuing the target and designing the bid. However, the service offering of an

M&A advisor need not be limited to advising on an ongoing live transaction. In fact, there is evidence that investment banks provide services that reach beyond a specific deal and in some cases even beyond pure deal advisory. Examples of these services are discussed below. As the empirical evidence on these additional services in the context of M&A advisory is relatively sparse, some of the examples are borrowed from equity issue literature.

It is well known that investment banks seek to maintain dialogues with companies even when companies are not engaged in a transaction in that particular moment. The dialogue may be centred on generic strategic issues or on more specific topics such as potential acquisitions or capital management. Firms may be rather passive in the dialogue possibly not even revealing their intensions on some issues, but investment banks are more active and provide companies with ideas regarding, for instance, the topics mentioned above. The ideas that investment banks provide may be valuable by themselves, such as ideas on capital management, or they may be valuable in the context of future actions that the firm may take, such as acquisitions. Either way, they can be seen as services to the firm. However, these services are typically not charged for separately but are thought to be paid for in the fees that firms pay for advisory and hence to come with the relationship. This existence of these additional services and the fact that firms attribute value to them is verified by the following quote from the treasurer of a large forestry company describing his firm's investment bank choice "They [the investment bank] provide us with good ideas free of charge on a regular basis and it's just fair that they get some of our business" (Currie and Morris (2001)).

In addition to provision of ideas on various topics there are may be two other additional benefits with regards to employing an investment bank. These have been suggested by the capital raising literature. First, Drucker and Puri (2004) note that firms often receive loans from their underwriters around the time of the issue. Furthermore, these loans appear to be priced relatively favourably from firms' perspective. Notably, this activity of tying lending and underwriting is not limited to investment banking arms of commercial banks as stand alone investment banks grant loans to issuers as well. To the extent that M&A advisors engage in the same activity, this may be beneficial for firms.

Second, firms may receive more active and/or more favourable analyst coverage from investment banks whose clients they are. In fact, Krigman, Shaw and Womack (2001) document that improving research coverage is one of the most important reasons why firm switch

underwriters between equity issues and SEOs. Furthermore, Ellis, Michaely and O'Hara (2004) find issuers switching to underwriters who are more optimistic about them than the average analyst's consensus. In addition, investment banks may also help their clients' IR efforts through other (less dubious) means. For instance, investment banks are known to arrange so called roadshows, where the management of a client firm effectively has the opportunity to market its equity to large investors.

2.3 Investment banks' perspective

2.3.1 Overview

The above discussion on investment banks and mergers and acquisitions explores the different roles that investment banks may serve in M&A. These are the roles that motivate employing financial advisors in corporate takeovers. Consequently, the view point taken in the above discussion is implicitly more that of a client than an investment bank's as the roles discussed act as reasons for firms to hire investment banks. However, as has been noted earlier, this thesis assumes two-sided matching. Therefore we must also consider the view point of investment banks. In the context of assignment models this amounts to discussing what may constitute the explicit and implicit transfer payments from firms to investment banks.

It should be noted that there is no established theory to guide the discussion on investment banks motives in M&A. However, it can be suggested that as for-profit organizations investment banks must be concerned with their profits. This, in turn, can be divided to short-term profits and long-term profits. Therefore it can be thought that when assessing the attractiveness of a prospective client and transaction, investment banks are concerned with fees from the present deal (short-term profits) and with issues that effect the present value of their future fee flows (long-term profits). Future fee flows, in turn, can be thought to be affected by the future activity of its present clients and by issues related to reputation capital. I will discuss each of these aspects next.

2.3.2 Fees

There are some papers that discuss fee contracts between firms and investment banks. Hunter and Walker (1990) examine the costs and benefits associated with employing investment banks

to facilitate mergers and acquisitions. In doing so, they also investigate fee contracts as they argue that in order for benefits to arise from employing investment banks, banks must face appropriate fee structures. While they note that a contract where fee is contingent on deal completion is by far the most common contract form, they do not provide any statistics on different contract forms. Using a sample of 126 successful US mergers from 1979 through 1985, Hunter and Walker (1990) find that fees are positively related to gains accruing to shareholders. They therefore conclude that merger fees are not excessive but represent fair compensation for the provision of advisory services.

McLaughlin (1990) conducts a detailed examination of fee contracts. His sample consists of the fee contracts of 195 tender offers between 1978 and 1985. Information on these contracts is obtained from SEC filings. This authentic data set allows him to document two key institutional features of what appear to be standard contract forms in the industry. First, as noted by Hunter and Walker (1990) in most contracts the level of fees is contingent on deal completion (or deal value in the case of targets). In a typical contract 20% of the fee is fixed and 80% is contingent on deal completion. Second, fees are positively related to deal value although as a declining function. In his sample McLaughlin (1990) observes that the total fees in a tender offer valued at or below $50 million are on average 3,15% of the offer value, but 1,92% in offers valued between $50 and $100 million and 1,51% in offers between $100 and $500 million. However, there is also great variation in fees. For instance, in transactions with a value of over $1 billion, fees can vary by over $14 million or by over 2 percentage points if measured as a percentage of offer value.

McLaughlin (1992) continues to examine fee contracts. He finds that more reputable investment banks are more likely to have contracts where fees are contingent on deal completion. Although more reputable investment banks receive higher fees on average, after controlling for contract form there is no difference in fees between investment banks from different tiers. Interestingly, he finds that fees to be paid on deal completion are higher in hostile deals, but realised fees, i.e. fees that were actually paid, are on average lower in these deals. This implies that there is insufficient compensation for advisors in hostile deals.

Rau (2000) also investigates, among other things, fee contracts. Consistent with McLaughlin (1990) he finds contingent fee contract to be the prevalent contract form. In his sample acquirers pay around 66% of fees in tender offers as contingent fees and 39% in mergers. Consistent with

McLaughlin (1992) he also finds more reputable investment banks charging a higher percentage of their fees in the form of contingent fees. More specifically, first-tier bank receive 73% of their fees in tender offers as contingent fees and 55% in mergers.

Given the discussion above, two empirical regularities in fee contracts between firms and investment banks stand out. First, fees are highly dependent on deal completion and even more so for more reputable investment banks. Second, fees are positively related to transaction value, although as declining function. Given that to some extent the amount of resources an investment bank has to expend to perform its advisory tasks is unrelated to whether the deal is eventually completed or not and also to the value of the transaction, investment banks have a strong incentive to work in large deals that are likely to be completed.

2.3.3 Subsequent deals

It is generally accepted that investment banking is a business characterized by long standing relationships between banks and their clients (see. e.g. Anand and Galetovic (2001)). Firms are more likely to grant business to investment banks with whom they have had dealings in the past. One of the best known examples of this feature of the business is the relationship between Goldman Sachs and Ford, which dates back to Ford's equity issue in 1956. According to a recent press report (Graig (2004)), Lehman Brothers, a rival investment bank, is the latest bank to have been forced to admit the continuing strength of this relationship. I will next go over the two studies that empirically examine relationships between firms and investment banks.

Using data on dealings between firms and investment banks, Baker (1990) examines organisation-market interfaces, that is, the pattern of direct market ties between firms and their banks. Pure transaction interface means that a firm uses a different investment bank every time it conducts capital market operations or engages in M&A. Pure relationship interface, on the other hand, implies that a firm uses only one investment bank for all its needs. Hybrid interface is between the two aforementioned interfaces. He draws his sample of firm-bank relations from SDC and it covers US equity and debt issues and mergers and acquisitions between 1981 and 1985. All together the sample consists of 1530 firms. While the theoretical framework of his study is sociological, the results can also be interpreted in a finance context.

Baker (1990) finds that most firms employ hybrid interfaces. That is, they conduct business with multiple banks but give some banks more business than others. For instance, the firms in his sample that do two or more deals during the sample period conduct on average eight transactions but use on average only three different lead banks in these transactions. However, pure relationship interfaces are not uncommon either. About 30% of firms in his sample give all their business to a single investment bank but these firms also tend to conduct fewer transactions. Furthermore, even though firms use multiple banks, they usually seem to have a designated relationship bank that they conduct most business with. On average, firms allocate 68% of their business to a single investment bank.

Saunders and Srinivasan (2001) investigate investment banking relationships and merger fees and their paper is therefore actually of two fold interest from investment banks' perspective. More specifically, they are interested in the strength of relationships between firms and investment banks, the occurrence of switching and how these are related to the level of fees paid by firms. Drawing their sample from SDC and covering years 1985 through 1998 they identify 656 mergers in which the acquirer had conducted at least one acquisition in the four years prior to the respective acquisition and for which there was sufficient data available in other respects.

Saunders and Srinivasan (2001) find the average relationship strength in their sample varying between 60% and 70% in most years. This means that, on average, firms (that do no switch advisors) employ investment banks who have conducted around two thirds of their business in the past. This figure is remarkably similar to that in Baker (1990) who finds firms granting 68% of their business to a single investment bank and further supports the notion of the importance of relationships in investment banking. Saunders and Srinivasan (2001) also report that almost 70% of the time firms use an advisor with whom they had completed at least one transaction in the past four years. Interestingly, they also observe that clients of more reputable investment banks are less likely to switch to an advisor with whom they had had no dealings in the past four years indicating that first-tier banks might have stronger relationships with their clients.

Regarding fees Saunders and Srinivasan (2001) find the strength of the relationship between a firm and its investment bank being statistically insignificant in determining the level of fees paid by the firm. In other words, firms receive no discount by being loyal to a given investment bank. Furthermore, it is documented that those firms that do not switch pay higher fees than those that do switch. Thus, not only do firms seem to gain nothing in terms of the fees paid by maintaining

a relationship with a given investment bank, but they actually appear to be paying higher fees to their relationship banks. Saunders and Srinivasan (2001) interpret their results as suggesting that there are costs related to switching an advisor and/or firms perceive benefits from continuing investment banking relationships.

Given the discussion above, it appears plausible to suggest that investment banks would prefer firms that are active participants in M&A in the future. This is for three reasons. First, a given mandate is more likely to be won by an investment bank that has had dealings with that particular firm in the past. Therefore, an investment bank can ex-ante expect to capture at least some of the future deal flow of its clients. Empirical evidence suggests that this share could be as high as two thirds. Second, repeated dealings with the same firm are likely to require less resources from an investment bank due to the well-know phenomenon of information reusability in financial intermediation (see e.g. Boot (2000)). Therefore mandates from a relationship client should call for less effort from bank's side. Third, empirical evidence suggests that investment banks receive higher fees from firms they maintain relationships with. Therefore these mandates should be more lucrative also from this perspective.

2.3.4 Reputation

"If you lose money for the firm by bad decisions, like I've done plenty of times for Berkshire, I will be very understanding. If you lose reputation for the firm, I will be ruthless." [3]

The above quote is from a letter Warrant Buffet, a legendary investor and one of the richest people in the world, wrote to employees of Salomon Bothers, a bulge bracket investment bank, on August 26, 1991 when he took over the investment bank from its previous chairman John Gutfreund in the wake of a bond trading scandal. It sums up pretty well the view on the importance of reputation capital in the investment banking industry. Reputation is considered one of the most important assets (if not the most important asset) of an investment bank. Therefore, when assessing the attractiveness of a piece of business, banks must also evaluate the potential risks that the particular venture may pose to their reputation capital. Next, I will

[3] This is an often quoted line from Warren Buffett and while the letter in which it originally appeared is, for obvious reasons, unavailable, it has been quoted in many sources. The source I have used is the website of Burson-Marsteller, a leading global PR and public affairs firm.

provide a theoretical motivation for the importance of reputation in investment banking and also present some related empirical evidence.

Theoretical motivation for the importance of reputation in investment banking can be derived from the classic papers of Klein and Leffler (1981), Shapiro (1983) and Allen (1984). These papers show that when quality is unobservable, firms have the incentive to build a good reputation by providing high quality products as this allows them to charge prices above the average cost of production. Firms have also the incentive to continue to provide high-quality products as long-term profits from charging premium prices are higher than the short-term profits that can be achieved by selling low-quality products at premium prices. While this analysis is with product market in mind, it can also be extended to the market for M&A advisory services as these two markets have two key things in common. First, the advice given by an investment bank to a firm engaged in a takeover is akin to the products discussed in the aforementioned papers in the sense that the quality of the advice is ex-ante unobservable. Second, in product market theories firms reap the profits that provide them with the incentive to deliver high-quality products by selling their products to customers repeatedly. This repeated interaction also gives customers an opportunity to observe the quality of these products. While the interaction of investment banks and their clients may not be repeated in the same way as in product market, investment banks engage in advisory assignments repeatedly, which exposes them and the quality of their advice to existing and prospective clients in the same way as in product market creating a disincentive to cheat by providing low-quality advice.

Following from the discussion above, reputation capital, i.e. having "a good reputation", allows premium pricing. High reputation investment banks can charge higher prices for their services. Therefore damages to reputation capital should be costly as they diminish the future cash flows. While there are no papers that would empirically examine this issue in M&A advisory context, there are few papers that address this issue in the underwriting market. In a seminal paper in this field, Beatty and Ritter (1986) report that investment banks that are prone to misprice over their 1977-1982 sample period subsequently experience market share losses. As this result may be partly attributable to a structural change in the underwriting industry over their sample period, Nanda and Yun (1997) investigate the direct impact of equity issue mispricing on lead-underwriter market capitalization. They hypothesise that, as the most important task of an investment bank in floatation is to price the issue, mispricing dilutes the value of bank's reputation capital and hence should show as a decline in the market value of its equity. This

hypothesis receives support from their results. Nanda and Yun (1997) observe that those equity issues that exhibit steeply negative initial returns, i.e. those that are overpriced, are related to statistically significant declines in the market capitalization of the lead underwriter. These declines are in excess of what can be attributed to after-market price stabilization costs thus suggesting that the losses in market value result from dilution in reputation capital caused by mispricing.

Similarly in the underwriting market, Beatty, Bunsis and Hand (1998) examine the effects of an SEC investigation on an underwriter and its past clients. While there are potential direct penalties related to SEC investigations, an investigation may also have indirect effects by imposing a revaluation of underwriter's reputation capital. Using a sample of 29 SEC investigations between 1980 and 1993, they indeed find that SEC investigations have serious indirect effects. First, investment banks under investigation experience a significant decline in market share in the year following the announcement of the investigation. In the 29 cases examined these market share declines are at least 50%. Second, past clients of the investment bank under investigation see their stock prices declining as a result of the announcement of the investigation. This can be related to an underwriter's role as a provider of assurances on the degree of information asymmetry between the firm whose equity it has underwritten and the market. The ability to provide these assurances is, in turn, linked to reputation capital. Beatty, Bunsis and Hand (1998) therefore conclude that SEC investigations carry significant negative impacts in excess of possible direct sanctions. These impacts are mostly related to negative changes in underwriter reputation capital.

As has been discussed earlier, Chemmanur and Fulghieri (1994) model reputation acquisition by investment banks in capital issuance but note that their model is also applicable to investment banks producing information about target firms in corporate takeovers. Their model differs from product market models in one crucial aspect, namely unlike producers in product market investment banks can make mistakes without damaging their reputation capital permanently. This reflects the reality of investment banking: even following the most stringent procedures does not prevent mistakes taking place from time to time. While in Chemmanur and Fulghieri (1994) investment banks control the likelihood of mistakes by setting their evaluation standards, there is also another way to render oneself less mistake-prone. That is, investment banks can pre-screen potential ventures and select the ones where they run the lowest risk of making a mistake with a given level of effort. Thus investment banks should be concerned with

associating with firms and transactions that do not entail significant risks to their reputation capital.

2.4 Summary of the theoretical framework

Two-sided matching provides a theoretical framework for this thesis, as the model presented in the next section is an assignment model. In this section I have described the key principles of two-sided matching and more specifically assignment models. In assignment models each possible matching of agents is associated with a surplus that is unique to that specific matching. Matched agents divide the surplus between each other by means of transfer payments. Equilibrium is reached when the total surplus from all matchings is maximised. If agents' characteristics are complementary then matchings are positive assortative, i.e. a better agent from one set will always be matched with a better agent from the other set.

In this section I have also described the various functions that investment banks may serve and thus given reasons for firms to employ investment banks. These functions performed by investment banks can be thought of as contributing to the surplus mentioned above. In addition, I have introduced investment banks' point of view and discussed factors that affect their short-term profits and the present value of their long-term profits. In the context of assignment models these can be seen as transfer payments from firms to investment banks.

Given the theoretical framework discussed in this section, I will next present the model for firm-investment bank matching that is utilised in this thesis and develop empirically testable hypotheses based on the model.

3. The model and hypotheses

This section first presents a model for firm-investment bank matching in the market for M&A advisory services. As the model presented here is largely based on a model for equity issue underwriting services, differences in assumptions between the two models and the applicability of the model to M&A advisory services are then discussed. Likely shortfalls of the model are also considered. Finally, implications of the model are explored and empirically testable hypotheses based on the implications developed.

3.1 The model for firm-investment bank matching

The model presented next is largely based on the model Fernando, Gatchev and Spindt (2004) develop for the market for equity issue underwriting. I thus follow their notations and for proofs one is advised to consult their paper. It is clearly indicated where the present model departs from their assumptions. The model assumes an economy in which there are firms who seek to complete M&A deals and investment banks who advise firms in these deals. It is further assumed that each firm employs a single investment bank while an investment bank can simultaneously advise multiple firms up to an exogenously determined capacity constraint. Throughout the analysis the decision of the firm to seek to complete a deal is taken as given and it is assumed that there is enough investment banking capacity to advise all the firms.

I examine the association problem of I firms and J potential investment banks in this economy. This setup is virtually identical with Fernando, Gatchev and Spindt (2004) in all but one respect. While Fernando, Gatchev and Spindt (2004) implicitly takes as given that firms issue securities, the model here takes as given only the intention to complete deals. To put it differently, firms in my economy seek to complete deals but are not certain to complete them whereas in Fernando, Gatchev and Spindt (2004) issues will take place for sure. This assumption is motivated by a key institutional difference between equity issue and M&A markets. Namely, it is more likely that an M&A deal rather than an equity issue fails to be completed.

Henceforth I will for the sake of simplicity refer to deals in my text but, as stated above, they are actually just intentions to complete deals. In a way they can be viewed as projects which, if successful, result in a deal being completed. Investment banks advise firms in these projects. Each individual firm (and its deal) $i = 1,..,I$ is characterized by a quality parameter, q_i and each

individual bank j = 1,..,J is characterised by an ability parameter, a_i. In general, these parameters could represent aggregate measures of quality and ability vectors. It should be noted that firm quality in this context captures also the characteristics of the deal that the firm seeks to complete. One should also bear in mind that firm quality does not necessarily correspond to conventional notions of good or bad quality, but rather refers to a given firm's contribution to the surplus arising from its match with a given investment bank. Same goes for investment bank ability. Firm quality and bank ability are both indivisible in the sense that they cannot be traded in partial units or parcelled off. For instance, an investment bank cannot divide its ability into smaller units among its clients but rather each client receives the same amount of ability, measured by the ability parameter a_i. I let $q_1 > q_2 > ... > q_I$ and $a_1 > a_2 > ... > a_J$. Allowing for firms and investment banks to have equal characteristics (i.e. $q_i = q_{i+1}$ or $a_i = a_{i+1}$) does not change the results qualitatively. The assumptions concerning firms/deals and investment banks in this paragraph are identical with those that Fernando, Gatchev and Spindt (2004) make with respect to firms/issues and underwriters.

As in Fernando, Gatchev and Spindt (2004) I assume that if firm *i* is matched with bank *j* then a joint surplus of $H_{i,j} = H(q_i, a_j)$ is produced. The fact that the decision to seek to complete a deal is taken as given implies that necessarily $H_{i,j} > 0$ for all $\{i, j\}$ pairs. Should a firm or a bank stay unmatched then no surplus is produced $(H_{i,0} = H_{0,j} = 0)$. However, in the definition of the surplus I depart from Fernando, Gatchev and Spindt (2004). In their model the surplus is confined to represent the value created in the issue process net of all direct and indirect costs incurred by the issuer and the investment bank. Here the surplus is allowed a more vague definition. It represents not only the value expected to be created in the present deal, but also the value expected to be created with the same pair in subsequent deals and in other services that the investment bank may provide to the firm. This figure is in dollar-terms and can be reasonably assumed to meet the $H_{i,j} > 0$ condition.

This more vague definition is motivated by the fact that both firms and investment banks are likely to take a long-term view on matching. This is due to the nature of M&A advisory, which is characterised by long-standing relationships. Saunders and Srinivasan (2001) suggest that firms may perceive benefits from continuing relationships and show that investment banks earn higher fees from relationship clients. Therefore factors beyond the present deal are likely to play

a role in determining the observed firm bank pairs. For instance, a firm may hire an expensive high reputation advisor to a small deal if it wishes to form a relationship with this investment bank and thus secure access to its services in subsequent deals. Similarly, a high reputation investment bank may settle for a relatively less lucrative mandate if it expects this to bring more lucrative mandates in the future. Furthermore, as discussed in Section 2.2.7, investment banks may also provide other valuable services that are not directly related to advisory tasks in the present deal.

Firm quality and investment bank ability are assumed to be complementary in the sense that the returns, measured in terms of joint surplus, to firm quality are increasing in investment bank ability, and the returns to investment bank ability exhibit the same thing with respect to firm quality. Fernando, Gatchev and Spindt (2004) argue this notion to fit the firm-underwriter matching market particularly well and the same argument can be extended to cover the corresponding matching market for M&A advisory services as well. It seems plausible to assume that high quality firms will be better able to capitalize on the services of high quality investment banks, while high quality investment banks, in their turn, will make a better use of the superior characteristics of a high quality firm. This assumption can be stated as $H_{i,j} - H_{i,j+l} > H_{i+k,j} - H_{i+k,j+l}$ for any i, j and any $k > 0, l > 0$, which corresponds to the condition that was stated in Section 2.1.2 to be stipulated by the assumption of positive assortative matching. Therefore, as in Section 2.1.2, by reordering the terms it can be seen that this is equivalent to $H_{i,j} - H_{i+k,j} > H_{i,j+l} - H_{i+k,j+l}$ for any i, j and any $k > 0, l > 0$

Moreover, as in Fernando, Gatchev and Spindt (2004), firms and investment banks are perfectly informed about each other's characteristics and about the properties of the surplus function and maximize the joint surplus arising from a match. In addition, transfer payments between any firm and investment bank are allowed and no prior contractual obligations are assumed to exist to prevent the matching of any firm with any underwriter.

3.2 Discussion of the model

Above has been presented an assignment model for the matching of firms and investment banks in the market for M&A advisory services. While the notations are intentionally virtually identical with the model for the market for equity issue underwriting services by Fernando,

Gatchev and Spindt (2004), the model itself is not identical in the sense that, as has been mentioned above, their assumptions are departed from in two respects. First, in the present model firms have only intentions to seek to complete deals but are not certain to complete them, whereas in Fernando, Gatchev and Spindt (2004) firms simply decide to issue equity and are implicitly certain to do so. This difference in assumptions, which is based on the fact that it is more likely that an M&A deal rather than an equity issue fails to be completed, leaves more room for uncertainty in the present model.

Second, here the definition of the surplus is vaguer than in Fernando, Gatchev and Spindt (2004) allowing it to capture not only the value expected to be created in the present deal but also the value expected to be created with the same pair in subsequent deals and in other services that the investment bank may provide to the firm. I believe this vaguer definition to more accurately reflect the nature of investment banks' advisory services and also to better depict the view points of both firms and investment banks when they consider the attractiveness of each other. For instance, Saunders and Srinivasan (2001) suggest that both firms and investment banks appear to perceive benefits from continuing relationships. This vaguer definition of the surplus also suggests that subsequent activities may play a role in determining the matches.

A related question that one may ponder is the surplus assumption itself. That is, how realistic is it to assume that $H_{i,j} > 0$ always holds, i.e. that value is always created? This is an especially intriguing question to pose knowing that many acquisitions result in shareholder value destruction for acquirers (see, for instance, Harford (1999) and Moeller, Schlingemann and Stulz (2004)). Moreover, as discussed in Section 2.2.5, the empirical evidence on investment bank ability and shareholder value creation in M&A is ambiguous. However, there are two issues that one may wish to consider at this junction. First, regarding the definition of the surplus, the value created need not refer solely to shareholder value but may include, for instance, value created for the management. Even if no value is created for shareholders in a given transaction, value may still be created for those who actually made the decision to pursue the acquisition. It is no secret that most often it is the management who makes this decision and hires the investment bank. Second, the surplus only refers to value expected to be created and hence is not the same thing as observed value creation. People can make mistakes and expectations don't always materialise. Therefore, observing a shareholder value destructing deal

does not mean that value wasn't expected to be created at least for some party, the management for example.

However, even with these assumptions the present model is still likely to fall short of correctly predicting all observed firm-investment bank matchings. The reason for this is that in reality the joint surpluses resulting from firm-investment bank matchings are unlikely to be monotonically increasing in firm quality investment and bank ability as assumed in the present model. This would mean that the matching pattern is not strictly positive assortative or, equivalently, that the condition $H_{i,j} - H_{i,j+l} > H_{i+k,j} - H_{i+k,j+l}$ for any i, j and any $k > 0, l > 0$ does not hold. The positive matching pattern can be broken, for instance, by a boutique investment bank that possesses superior skills in a narrow field, say, in a given industry.

The surplus matrix below exemplifies this. Numbers denoted to firms F and to investment banks B represent rankings, with one being the highest, and values in the matrix represent surpluses from different pairings of firms and investment banks.

	F_1	F_2	F_3
B_1	120	60	30
B_2	100	50	25
B_3	80	200	20

Here positive assortative matching does not hold because F_2 produces such a high surplus with B_3. For firm F_2 the surplus is not monotonically increasing in investment bank ability and for investment bank B_3 the surplus is not monotonically increasing in firm quality. In the matrix above optimal pairings would be F_1 to B_1, F_2 to B_3 and F_3 to B_2. Therefore, in this case the optimal matching pattern does not lie on the diagonal as stipulated by positive assortative matching. A situation like this may arise, for instance, when B_3 is a boutique investment bank that is extremely skilled in some discipline that is highly relevant for firm F_2 but not for other firms. A recent example of this, coming from the media industry, would be Comcast's unsolicited (and later failed) takeover attempt of Disney in early 2004. Valued at close to $50 billion, the deal featured two boutique investment banks, Quadrangle Group and Rohatyn

Associates, as Comcast's advisors (Thomson Financial (2004)). The former boutique specialises in media and communications industries while the latter is known for its renowned leader Felix Rohatyn who has previously been, among other things, Comcast's board member. Based on their league table positions in the previous year the two investment banks should have not been involved in such big-ticket transaction and consequently appeared punching above their weight.

As the model presented in this paper assumes that the joint surpluses are monotonically increasing in both firm quality and investment bank ability, in situations like above the model falls apart. Therefore in the empirical part I seek to trim the sample to exclude deals which feature boutique investment banks as advisors. However, apart from boutique investment banks, there are grounds to expect that the model would be a good predictor of observed firm-investment bank pairs. For one, there appears to be a commonly accepted hierarchy of investment banks to the extent that banks are often classified according to their position in the hierarchy. For instance, business press commonly refers to first tier, or bulge bracket, banks and to second tier, or major bracket, banks. Secondly, it would not seem too far fetched to assume that at least the size of the deal should be related to the surplus arising from it implying that a hierarchy of firms and their deals can also be constructed. Finally, as required by assignment models, both investment bank ability (reputation) and firm/deal quality (their characteristics) are indivisible. For instance, an investment bank cannot divide its ability in two and offer it to twice the number of firms. Similarly, a firm cannot divide its characteristics.

3.3 Hypotheses development

Given the model presented above, in what follows I will develop hypotheses that arise as implications of the model. However, one should be careful to note that the hypotheses that follow are just implications of the present model and are not designed to reject any other model, for instance a model based on one-sided selection. In fact, formulating hypotheses that would be able to differentiate between one-sided and two-sided selection is extremely difficult. Still, an assignment model gives a firm theoretical foundation to derive implications from, whereas papers assuming one-sidedness have weaker theoretical grounds to base their hypotheses on. For instance, Rau and Rodgers (2002) hypothesise that simply because larger firms have more resources they will hire better investment banks.

A natural starting point for exploring the implications of the model is to investigate observed firm-investment bank pairs. Examination of observed pairs is the standard approach in matching literature not only in economics (see, for instance, Spurr (1987) but also in other academic disciplines, such as biology (Shine, O'Connor, Lemaster and Mason (2001) provide an example with snakes) and sociology (Gelissen (2003) studies divorces and remarrying). Note, however, that in biology and sociology matching is normally called mating.

I therefore next turn to more closely examining the matching pattern that the model predicts. It was assumed above that $H_{i,j} - H_{i,j+l} > H_{i+k,j} - H_{i+k,j+l}$ for any i, j and any $k > 0, l > 0$. This is equivalent to assuming that the joint surplus is monotonically increasing in both firm quality and investment bank ability. From this is must follow that the equilibrium is characterized by positive assortative matching. To put it differently, the matching pattern of firms and investment banks is one in which firm quality and investment bank ability are positively correlated. This yields the first set of hypotheses where I investigate the relation of IB ability and various proxies of firm quality.

As noted earlier, the definition of the surplus is rather vague. However, part of it is related to the present deal. Therefore, since the joint surplus $H(q_i, a_j)$ is expressed in dollar-terms it would appear plausible to assume that it is increasing in deal size. Even if relative value creation is identical in two deals the larger deal will enjoy larger absolute value creation. Thus, I advance the first hypothesis:

Hypothesis 1: For firm-investment bank pairs $\{i, j\}$ the size of the deal that firm i seeks to complete is increasing in the ability of bank j.

Section 2.2.7 discussed other valuable services that investment banks may provide to their clients in addition to pure deal specific M&A advisory. These additional services may include, for instance, advice on non-deal related issues, better analyst coverage and financing. In the model these services were assumed to contribute to the joint surplus. It would seem reasonable to expect the value of these services to be related to the size of the client. For example, better analyst coverage is likely to be more valuable for a company with higher market capitalization. Hence the following:

Hypothesis 2: For firm-investment bank pairs $\{i, j\}$ market capitalization of firm i is increasing in the ability of bank j.

When defining the surplus, the present model departs from Fernando, Gatchev and Spindt (2004) in that here the surplus is allowed to not only the value expected to be created in the present deal but also the value expected to be created value expected to be created by firm-investment bank pair $\{i, j\}$ in subsequent deals. This seems plausible as firms and banks appear to perceive benefits from continuing relationships. Realising the surplus from subsequent deals is, however, obviously dependent on firm *i* engaging in M&A in the future. If there are no deals subsequent to the present one, then no subsequent value creation can be expected either. This stipulates the third hypothesis:

Hypothesis 3: For firm-investment bank pairs $\{i, j\}$ the likelihood that firm i seeks to engage in M&A activity in the future is positively related to the ability of bank j.

The first three hypotheses have effectively been related to the scale of resources effect in the sense that they imply more able investment banks being associated with different dimension of client's scale. Still, the model presented above implies that firm quality could entail more than just scale characteristics. The problem with identifying other firm characteristics that would signal quality is that quality is a multidimensional concept. It is difficult to track down to specific measures. Yet, while it is hardly something one can put a finger on, there often seems to be a consensus that a certain firm is of high quality while another one isn't.

I therefore use an indirect way to proxy for firm quality. Namely, the whole M&A market has sometimes been described as a market for corporate control where the resources of poorly performing firms are transferred to high quality firms (see, for instance, Jovanovic and Rousseau (2002)). I thus use measures that have been shown to separate the presumably low-quality firms that are acquired from other presumably higher quality firms. More specifically, I borrow a set of generic measures from Comment and Schwert (1995) who find these measures to exhibit statistically significant differences between the sample of firms that are acquired and the sample of firms that are not acquired. Casual experience also shows that these measures are often used to rank companies lending them further credibility as measures of firm quality. Thus the fourth hypothesis:

Hypothesis 4: For firm-investment bank pairs $\{i, j\}$ generic firm quality measures of firm i are increasing in the ability of bank j.

Finally, while firms and investment bank are assumed to be perfectly informed about the properties of the surplus function, the exact value of the joint surplus $H(q_i, a_j)$ arising as a result of the match is not a certain thing. Already its definition allows expectations which by necessity imply uncertainty. Furthermore, as has been discussed earlier, reputation capital is a precious thing for investment banks and they are keen to preserve it therefore being likely to wish to avoid uncertainty. While sudden deteriorations in investment bank ability are not unheard of, it is highly more likely that the uncertainty stems from the firm's side. Hence the following:

Hypothesis 5: For firm-investment bank pairs $\{i, j\}$ the volatility of firm i's stock is negatively related to the ability of bank j.

These are the direct implications of the model presented. However, by further examining the model one is able to derive more implications. Fernando, Gatchev and Spindt (2004) note that when investment bank ability is valuable (as it is in the present model), then more able investment banks will always find a match as long as their less able counterparts have also found a match. This is natural since under positive assortative matching when a given agent is matched then all agents of better quality must also be matched as matching starts from the top.

The present model assumes that each investment bank has an exogenously determined capacity constraint. Hence, a given investment bank is matched only if its more able counterparts have reached their capacity limit and cannot serve more firms. Therefore the higher the number of firms in the market the more firms there will be who are not served by the more able investment banks who have reached their capacity limit. Consequently, in a more active market, i.e. when there are more firms in need of an advisor, more able investment banks will advise a lower share of the firms in the market. This yields the sixth hypothesis:

Hypothesis 6: The market share of more able investment banks is negatively related to the overall activity of the market when both market share and the level of activity are measured in terms of number of deals.

Fernando, Gatchev and Spindt (2004) also note that quality and ability need not be absolute for matching to occur. In other words the best firm and the best bank will always find a match (each other) no matter what their absolute qualities and abilities happen to be. It is relative rather than absolute attributes that matter in determining which firm matches with which investment bank. However, absolute attributes are still of importance as they determine the absolute quality of observed matchings. For instance, when the average quality of firms increases, then a given investment bank is likely to match with firms of better absolute quality.

While the conjecture above is rather self-evident, Fernando, Gatchev and Spindt (2004) also point out two other, more interesting, implications. First, when the variance of the quality of firms in the market increases, the most able investment banks will match with firms whose absolute quality is likely to be farther away the average. As a result, the absolute client quality of best investment banks should increase in the variation of the overall quality assuming that the average quality stays constant.

Second, when the number of firms increases, the number of firms whose quality is above a given level will also increase assuming that the average and variance of firm quality remain constant. As an example, consider a scenario where in a market of 400 firms the best investment banks have enough capacity to serve 100 firms, in other words the top 25% of the market. If the number of firms in the market increases by 100 to 500, the 100 firms served by the best investment banks will then represent the top 20% of the market. The average quality of top 20% should be higher than the average quality of top 25%.

Given the discussion above, it would seem fair to posit the following:

Hypothesis 7: The average quality of clients of more able investment banks is positively related to the average quality of all firms in the market, positively related to the variation of firm-quality in the market and positively related to the number of firms in the market.

Finally, the present model has also implications on the fees investment banks receive from advising firms. This can actually be viewed as a problem of how to divide the joint surplus resulting from the match between the firm and the bank. As stated earlier, fees are determined after the matching in a bargaining between the matched parties. This implies that in a given pair investment bank's fees depend on its bargaining power relative to the firm. Therefore no uniform fee level that should hold for all deals exists. However, boundaries between which the fees should lie can be derived from the model. Fernando, Gatchev and Spindt (2004) present the following upper and lower boundaries for fees for a match between investment bank *j* and firm *i*:

$$U_{j,j}^{lower} = \sum_{n=j}^{J-1} \left(H_{n+1,n} - H_{n+1,n+1} \right)$$

$$U_{j,j}^{upper} = H_{j,j} - \sum_{n=j}^{J-1} \left(H_{n,n+1} - H_{n+1,n+1} \right)$$

$$When\ j = J\ then\ U_{J,J}^{lower} = 0 \text{ and } U_{J,J}^{upper} = H_{J,J}$$

These boundaries indispensably result from the positive assortative matching equilibrium. The lower bound for an investment bank matching with a given client is the lower bound for an investment bank with one lower rank matching with a client of one lower rank plus the increase in surplus that would be achieved if the client with a one lower rank matched with the investment bank. Fernando, Gatchev and Spindt (2004) state this formally as $U_{j,j}^{lower} = U_{j+1,j+1}^{lower} + \left(H_{j+1,j} - H_{j+1,j+1} \right)$. It can be easily seen why this must be the case in equilibrium. If an investment bank would get less than the lower bound it would find it beneficial to switch to a client with one lower rank. Similarly, if a firm would pay more than the upper bound it would find it beneficial to switch to an advisor with one lower rank. By definition equilibrium is characterized as an outcome in which no firm or investment bank can benefit from switching without making someone else worse off. Therefore the above definitions must hold in equilibrium.

In addition one can examine the proportionate allocation of the surplus received by investment banks. Given the above definitions for absolute upper and lower boundaries the proportionate boundaries can be stated as:

$$\alpha_{j,j}^{lower} = \sum_{n=j}^{J-1} \left(H_{n+1,n} - H_{n+1,n+1} \right) / H_{j,j}$$

$$\alpha_{j,j}^{upper} = \left[H_{j,j} - \sum_{n=j}^{J-1} \left(H_{n,n+1} - H_{n+1,n+1} \right) \right] \Big/ H_{j,j}$$

The last two hypotheses concern the proportionate allocation of the surplus received by investment banks. While the joint surplus $H(q_i, a_j)$ cannot be observed, it seems reasonable to expect it to be related to deal size. Therefore fees as a percentage of the deal size (percentage fees) are used as a proxy for the proportionate allocation of the joint surplus. As discussed above, for a given match fees are determined in bargaining between the firm and the investment bank and must lie between the boundaries derived above. Ceteris paribus one would expect more able investment banks to have more bargaining power relative to their less able competitors. Thus the following:

Hypothesis 8: For firm-investment bank pairs $\{i, j\}$ percentage fees paid by firm i are positively related to the ability of bank j.

However, there are two sides in the bargaining and hence the bargaining power of the firm is also an important determinant of percentage fees. To the extent that deal size is an important determinant of the surplus bargaining power should also increase in deal size. This leads to the final hypothesis:

Hypothesis 9: For firm-investment bank pairs $\{i, j\}$ percentage fees paid by firm i are negatively related to the dollar value of the transaction firm i seeks to complete.

4. Data and methodology

This section first discusses gathering of the data and construction of the general sample. Then calculation of the variables that are used as firm quality proxies in this thesis is described. Finally, the methodology behind the computation of the investment bank ability variable is also presented and related issues discussed.

4.1 General sample

My sample consists of firm-investment bank pairs in M&A transactions where the firm acted as an acquirer and the investment bank as an advisor to the acquirer. The sample of M&A transactions is drawn from Securities Data Corporation's SDC Platinum database. More specifically, I first get all transactions that were announced between January 1st 1984 and December 31st 2003 subject to the following constraints:

- Both the acquirer and the target were domiciled in United States
- The value of the transaction was $5 million or more
- The acquirer acquired or sought to acquire 90% or more of the target
- The acquirer was listed
- The acquirer used an advisor

I use US data because of its better availability and to allow comparability to earlier M&A studies which almost uniformly use US transactions. In addition, this allows me to base my investment bank reputation variable to US league table data and prevents me from having to construct separate reputation variables for different markets. The value of transactions is limited to $5 million or more as it is very unlikely that an advisor is used in smaller transactions. The majority deal constraint is used to preclude share buy backs and transactions where the acquirer already had a substantial toehold and to limit the sample to transactions where the acquirer was truly aiming to capture control of the target. The restriction on the acquirer being listed is applied because some of my firm quality variables are based on share price. Finally, as I am studying firm-investment bank pairs, I naturally include only transactions in which the acquirer actually used an advisor, i.e. where there was a firm-investment bank pair.

In addition to the constraints listed above, I also exclude deals in which the investment bank of the acquirer appeared as an advisor in less than five deals during the year of the announcement of the deal. This exclusion is done to drop so called boutique investment banks from the sample. These are investment banks that rely heavily on their skills and competence on some narrow area and on the excellent client relationships possessed by few senior deal makers. Thanks to their skills and relationships, boutiques advice on large deals but usually just in very few per year. Consequently the variable I use in constructing the hierarchy of investment banks assigns a low ranking for boutiques. Given that they still mostly appear in large deals, boutiques might distort the results and are thus excluded.

This gives the general sample of transactions and firm-investment bank pairs to be used in this study. There were 5714 transactions that met the criteria above. However, the sample is further restricted substantially due to data availability for the firm quality variables. I will thus next list the variables used in this study and describe their construction.

4.2 Variable construction

By the nature of this study, I must identify proxies to be used as measures of firm quality and investment bank ability. Again, it should be noted that in this context both refer only to the respective marginal contributions of these agents to the surplus arising from their match and consequently do not necessarily correspond to conventional notions of quality. For instance, firm quality includes characteristics of the transactions that the firm seeks to complete. One should alsol bear in mind that the analysis in this thesis is limited to acquirers and their advisors and consequently in what follows firm quality measures refer only to acquirer's and corresponding deal's characteristics. Some of the measures that are used as proxies for firm quality have already been mentioned in Section 3.2 where the hypotheses were laid out. These included transaction size, market capitalization and subsequent M&A activity of the acquirer and the volatility of the acquirer's stock. The first three variables effectively stem from scale of resources effect, which holds that more able agents will match with more resources. The fourth variable is used as a proxy for the uncertainty regarding the value of the surplus.

Additionally, it was hypothesised that what were called generic firm quality measures would be increasing in investment bank ability. However, these were not explicitly listed. The problem with these firm quality measures is that they are difficult to define. What exactly is firm quality

in a traditional sense? I solve this conundrum by using an indirect way to derive proxies for firm quality. As M&A has sometimes been likened to a process where resources of poorly performing firms are transferred to high quality firms (see, for instance, Jovanovic and Rousseau (2002)), I use measures that have been shown to separate the presumably low-quality firms that are acquired from other presumably higher quality firms. More specifically, I borrow a set of generic measures from Comment and Schwert (1995) who find their measures to exhibit statistically significant differences between the sample of firms that are acquired and the sample of firms that are not acquired. Casual experience also shows that these measures are often used to rank companies lending them further credibility as measures of firm quality. The variables I use are P/B, P/E, leverage and cash ratio calculated as four-year averages and growth rate of sales over the last four years. These are identical with the variable set in Comment and Schwert (1995) with the exception that I exclude two variables that they use. Total assets are excluded as it is highly correlated with market capitalization which I use in another hypothesis. Abnormal stock price performance is excluded due to poor data availability. I use dummies for deal attitude (hostile) and payment method (equity) as these are often used as control variables in the literature (see, for instance, Servaes and Zenner (1996) and Kale, Kini and Ryan (2003)).

The aforementioned variables and their construction are listed below. The data for the following six measures is drawn from Worldscope / Thomson Financial:

P/B: I take the average of the fiscal year end Price / Book value ratios of the last four years preceding the transaction. I exclude firms for which the ratio is over 10 or below 0.5.

P/E: I take the average of the fiscal year end Price / Earnings ratios of the last four years preceding the transaction. I exclude firms for which the ratio is over 50 or below 5.

Leverage: I take the average of the fiscal year end Debt / Equity ratios of the last four years preceding the transaction. I exclude firms for which the ratio is over 300 or below 0.

Cash ratio: I first calculate the ratio of Logarithm of cash and equivalents / Logarithm of total assets for the last four fiscal year ends preceding the transaction. I then take an average of this ratio for last four years.

CAGR of sales: I calculate the cumulative annual growth rate of sales of the last four fiscal years preceding the transaction. I exclude firm for which this measure is over 100% or below -20%.

Volatility: I take the volatility of the share price in the last fiscal year preceding the transaction. Due to poor data availability related to this measure, I don't use a four-year average as with the other variables.

Next seven variables are derived from data from SDC Platinum:

Log of market capitalization: I take the logarithm of the market capitalization in the last fiscal year preceding the transaction.

Log of deal value: I take the logarithm of the value of the transaction. This includes the value of net debt.

Stock dummy: This variable takes a value of 1 if more than 50% of the transaction was equity financed. Otherwise it takes a value of 0.

Hostile dummy: This variable takes a value of 1 if the transaction is listed as hostile in the database. Otherwise it takes a value of 0.

Subsequent deal dummy: This variable takes a value of 1 if the acquirer announced one or more transactions in the 1095 days (i.e. 3 years) following the announcement of the present transaction. Otherwise it takes a value of 0.

Subsequent deal flow: This is the sum of the logarithm of US dollar values of the transactions that the acquirer announced in the 1095 days (i.e. 3 years) following the announcement of the present transaction.

Flow with the same advisor: This is the sum of the logarithm of US dollar values of the transactions in which the same advisor as in the present deal was used that the acquirer announced in the 1095 days (i.e. 3 years) following the announcement of the present transaction.

One should note that the last three variables, which are based on subsequent deals, stipulate a further restriction on the sample in some regressions. Namely, in order to avoid horizon bias related to using variables based on subsequent deals, I must allow a full three years to lapse from the last observed firm-investment bank pair to see whether the firm engaged in any deals in those three years. As the general sample ends in December 2003, the last firm-investment bank pairs I can use in regressions with subsequent activity variables are from the end of 2000.

As one can see from above, plethora of variables are used to proxy for firm quality. This is natural, given the complex nature of firm quality in this context. However, only one variable is used in this thesis to proxy for investment bank ability. This is due to the fact that there appears to be a commonly accepted way to depict the hierarchy of investment banks. More specifically, the variable I use is based on the dollar flow of transactions in which a given investment bank acted as an advisor. Dollar flow is the measure used in the industry when so called league tables are calculated. These rank investment banks according to their share of the total dollar flow of transactions over a given period. Therefore the dollar flow an investment bank gets from a given transaction towards the calculation of league tables is often referred to as league table credit. League tables are closely followed by practitioners and are widely understood to reflect the hierarchy of investment banks (see, for instance, Douglas (1998)). While dollar flow based variables may be slightly problematic in empirical test, as dollar values of transactions are also used as variables in the same regressions, their use is widespread in both equity issue and M&A literature (see, for instance, Rau (2000) and Fernando, Gatchev and Spindt (2004)).

However, I do not use dollar flows *per se* as variables, but rather only use them to calculate Megginson-Weiss reputation values for a given investment bank. Thus, Megginson-Weiss reputation value and not dollar flow of transactions is the proxy for investment bank reputation. This variable is based on Megginson-Weiss (1991) and is calculated as in Aggarwal, Krigman and Womack (2002). Fernando, Gatchev and Spindt (2004) use the same variable as a proxy for underwriter ability in their study. The construction and computation of this variable is as follows:

I first get league tables from SDC for every year of the sample period as well for two years prior to the first year of the sample period. As Rau (2000) notes, deals that SDC takes into account when calculating its league tables include acquisitions of at least 50% of the target, repurchases, self-tender offers, exchange offers for equity and/or securities convertible into equity, and leveraged recapitalizations. They exclude purchases of less than 50% of the target any ownership interest valued at less than $1 million and splitoffs. SDC gives advisors full credit for each deal in which they provided advisory services, irrespective of whether they provided the advice to bidder or target.

These league tables give me data on the flow of deals in which individual banks acted as advisors in a given year. This is information is used to calculate Megginson-Weiss reputation value. For a set of investment banks *I* and every year *t* this is calculated by defining the three-year moving average (*t-2, t-1, t*) of the flow of deals in which bank *j* acted as an advisor. This moving average is denoted by x_{jt}. The Megginson-Weiss reputation value for bank *j* in year *t* is then calculated as:

$$MW_{jt} = \frac{\ln x_{jt}}{\max_{i \in I}[\ln x_{it}]} \times 100$$

Therefore, the bank with the highest three year moving average in a given year receives a reputation value of 100. The above definition also implies that the reputation value is a continuous variable.

Given that only single variable is used to proxy for investment bank ability, I take due care in constructing the Megginson-Weiss variables for each bank. The task of computing these measures is complicated by two issues. First, SDC league table data leaves room for improvement in terms of quality in the sense that the same investment bank may appear in the league tables under different names. For instance, in a given year CSFB and Credit Suisse First Boston may appear as separate entries in the league table, even though they are the same investment bank, meaning that the league table credit for the bank is also is split into two. I therefore recalculate the credits given to individual entries in the league tables so that each bank receives all the league table credit it deserves in a given year. In the above example this means

summing Credit Suisse First Boston's and CSFB's league table credit. Where it is ambiguous whether two entries with similar names are part of the same firm, I use company websites and news sources to check.

Second problem is posed by mergers. When calculating the three year moving averages, one must account for the past league table credit of the investment banks that have been acquired to arrive at correct Megginson-Weiss values for the present entities. For instance, Deutsche Bank did two major acquisitions during the sample period effectively building its US franchise from scratch. The quality of Deutsche Bank as an M&A advisor would be understated after these acquisitions if its Megginson-Weiss value included only past league table credit of Deutsche's old franchise. I therefore calculate three year moving averages for each individual investment bank including the past credit of investment banks that they have acquired. I detect investment banks that have been acquired by following all banks through the sample period and using company websites and news sources to check for the fate of the investment banks that disappear from league tables permanently. This gives me information on who acquired who and allows me to correctly calculate the three year moving averages.

5. Results

This section first presents some descriptive statistics on the sample of firm-investment bank pairs and transactions that is then used to empirically examine the implications of the model and provide evidence of matching in the market for M&A advisory services. The hypotheses laid out in Section 3.3 are briefly reviewed in the context of their testing.

5.1 Descriptive statistics

Figure 1 shows the how the general sample is divided over years. One should note that certain restrictions were applied in constructing the general sample and consequently it does not represent the total of M&A activity over the sample period. The construction of the general sample is described in detail in Section 4.1. Figure 1 refers to number of deals but equivalently these can be seen as number of firm-investment bank pairs, given the nature of this thesis and the methodology of the sample construction. In fact, from the perspective of this thesis it is actually more appropriate to view the figure below as showing the number of firm-investment bank pairs as it is these pairs rather than deals that are the point of interest in the regressions that follow. Figure 1 also shows the value of the deals in which these firm-investment bank pairs were involved in.

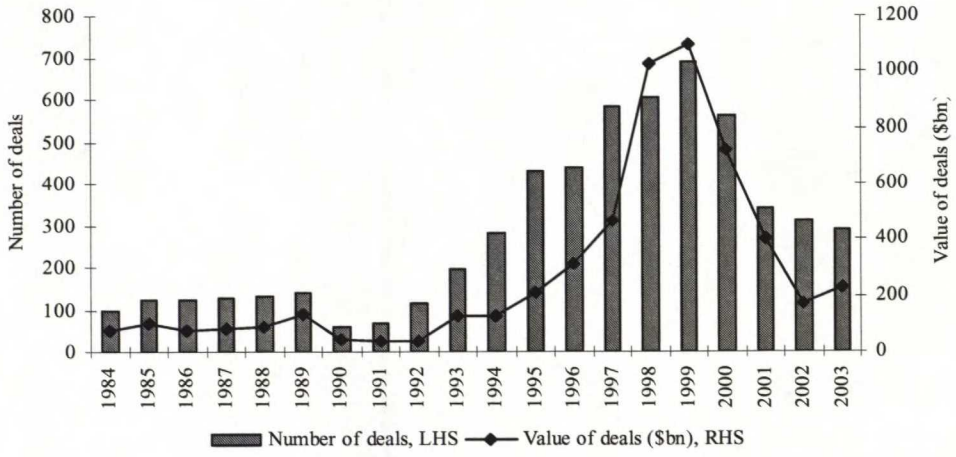

Figure 1: Number and value of deals in the sample period
This figure shows the dispersion of the transactions that correspond to the firm-investment bank pairs used in the analysis over the sample period 1984-2003. Note, however, that only transactions that satisfied the criteria in Section 4.1 are included and thus the figure does not represent the total M&A activity during the sample period. Deal values include net debt and are in billions of dollars. Dollar amounts are expressed in 2000 US dollars using the GDP implicit price deflator.

Unsurprisingly, one can observe late 1990s producing the greatest number of firm-investment pairs per year with peak being reached in 1999. The value of deals shows a similar pattern with 1999 again witnessing the peak. However, it is notable that the slope in both the run-up to peak and in the subsequent decline is markedly steeper for the value rather than number of deals implying that the average deal value is geared to the number of deals. The US recession in early 1990's appears to show as a period of drought in the general sample. It should be noted that the material skewness in the number of observations towards the end of the sample period may bias the results that follow.

Given that variables based on subsequent deals are included in many of the regressions that follow, a truncated sample is used in these cases. More specifically, while the whole sample period is used in calculating the variables related to subsequent deals, only firm-investment bank pairs up to year 2000 are included in regressions. This is done to preclude horizon bias resulting from the fact that subsequent deals are calculated from three years following the present deal. There is nothing sacrosanct in the use of three years as the period over which subsequent activity is observed. Rather, it is motivated by practical issues. More specifically, using a longer period than three years would result in an exclusion of a substantial part of the sample pairs as can be seen from the Figure 1. A shorter time interval, on the other hand, would lead to fewer deals being taken into account in when calculating the variables. In unreported regressions I also use variables that are calculated over five rather than three years. The results do not change qualitatively from those obtained using three years.

Table 1: Descriptive statistics on selected variables

This table shows descriptive statistics on selected variables from the sample of 5713 firm-investment bank pairs from 1983 to 2003. Market capitalization is as of end of the last fiscal year preceding the announcement of the transaction and is in millions of dollars. Deal value is the value of the transaction including net debt and is in millions of dollars. Megginson-Weiss reputation value is used as a proxy for investment bank ability and is based on the logarithm of US dollar value of the transactions in the last three years in which the investment bank had an advisory role over the logarithm of the total US dollar value of transactions in the same period. This variable is defined formally in Section 4.2. In calculating the variables all dollar amounts are expressed in 2000 US dollars using the GDP implicit price deflator.

	Market cap in $m	Transaction value in $m	Megginson-Weiss value
Mean	9805.2	975.7	82.7
Median	1245.9	164.9	90.0
Standard deviation	29275.9	4339.4	16.7

Table 1 shows few common statistical metrics for selected key variables in the sample. The first thing to note from the table is that for both market capitalization and transaction value averages

are markedly higher than medians. This suggests that there are some very large firms and transactions in the sample that drive the averages higher and also lead to substantial standard deviations. Therefore log transformations of these variables are used in the regressions that follow. Megginson-Weiss reputation values, on the other hand, do not seem to exhibit as wide dispersion and the average seems to be driven by low rather than high values. This is not surprising since log values were used computing the aforementioned reputation values. Consequently Megginson-Weiss variables are included in the analysis without transformation.

5.2 Firm-investment bank matching

The first five hypotheses developed in Section 3.3 refer to the matching patter of firms and investment banks. A pivotal feature of the model presented in this thesis is that the matching pattern of firms and investment banks should be positive assortative. That is, a more able investment bank is expected to match with a firm of higher quality. Whether this kind of pattern is seen in reality can be empirically examined by investigating the attributes of observed firm-investment bank pairs.

An essential issue in the empirical examination is properly defining investment bank ability and firm quality. As discussed in Section 4.2, only one variable is used for investment bank ability. This owes to the fact that there appears to be an industry-wide consensus on how to present the hierarchy of investment banks and consequently these so called league tables are used to compute Megginson-Weiss reputation values for investment banks in this thesis. A single variable for firm quality, however, is more difficult to pin down. Therefore several factors that may contribute to firm quality are considered. One should bear in mind that here firm quality does not necessarily correspond to conventional notions of good or bad quality, but rather only refers to a given firm's contribution to the surplus arising from its match with an investment bank. Furthermore, is should be noted that here the notion of firm quality captures also the characteristics of the deal the firm seeks to complete.

Hypotheses 1-3 are related to scale of resources effect, a commonly observed phenomenon in matching, which posits that more able agents should match with more work and resources. Deal value, market capitalization and the subsequent M&A activity of the firm are the three variables used in the three aforementioned hypotheses, respectively. Hypothesis 4 puts forth that so called generic firm quality measures would be positively related to investment bank ability. Finally,

Hypothesis 5 suggests that uncertainty, measured by the volatility of the acquirer's stock, is negatively related to investment bank ability.

Table 2: Individual firm quality measures and investment bank ability

This table examines observed firm-investment bank pairs and the relation of firm quality measures and investment bank ability. General sample is drawn from SDC Platinum and covers years from 1984 to 2003. However, in order to avoid horizon bias related to using variables based on subsequent deals, only firm-investment bank pairs from 1984 to 2000 are examined. Dependent variable in the OLS regressions below is the ability of the investment bank that acted as an advisor to the acquirer in the corresponding transaction. Megginson-Weiss reputation value is used as a proxy for investment bank ability and is based on the logarithm of US dollar value of the transactions in the last three years in which the investment bank had an advisory role over the logarithm of the total US dollar value of transactions in the same period. This variable is defined formally in Section 4.2. Independent variables relate to the acquirer that the investment bank advised and to the corresponding transaction. Market capitalization is as of end of the last fiscal year preceding the announcement of the transaction. Leverage, cash ratio, P/E and P/B are calculated as averages over the last four fiscal years preceding the transaction. CAGR of sales is similarly calculated over the last four years. Volatility is the volatility of the share price in the last fiscal year preceding the transaction. Deal value is the value of the transaction including net debt. Subsequent deal dummy takes a value of 1 if the firm announced one or more deals in the three years following the present transaction and is 0 otherwise. In calculating the variables all dollar amounts are expressed in 2000 US dollars using the GDP implicit price deflator. Dummies are included to control for the year during which the transaction was announced and for the firm's industry using the first digit of the firm's primary SIC code. T-values are from a two-tailed t-test and given next to the respective coefficients. ***, **, * denote statistical significances at the 1%, 5% and 10% levels, respectively.

Dependent variable	Investment bank Megginson-Weiss reputation					
Panel A	I		II		III	
	Coefficient	t value	Coefficient	t value	Coefficient	t value
Intercept	56.94***	7.77	63.27***	6.92	68.75***	7.24
Log of market cap	2.64***	12.48				
Leverage			2.55***	5.08		
Cash ratio					-3.15	-0.66
Year dummies	*V*		*V*		*V*	
SIC dummies	*V*		*V*		*V*	
N	3801		2532		2308	
R-squared	0.13		0.15		0.10	

Panel A - continued	IV		V		VI	
	Coefficient	t value	Coefficient	t value	Coefficient	t value
Intercept	65.93***	5.96	62.41***	4.13	65.08***	4.19
CAGR of sales	0.90	0.25				
P/B			5.07***	2.91		
P/E					3.76**	2.13
Year dummies	*V*		*V*		*V*	
SIC dummies	*V*		*V*		*V*	
N	2872		2115		2183	
R-squared	0.12		0.14		0.13	

Table 2 - continued

Dependent variable	Investment bank Megginson-Weiss reputation					
Panel A - continued	VII		VIII		IX	
	Coefficient	t value	Coefficient	t value	Coefficient	t value
Intercept	83.50***	7.31	59.33***	9.22	80.70***	11.18
Volatility	-10.26***	-4.98				
Log of deal value			9.96***	36.33		
Subsequent deal dummy					2.96***	6.23
Year dummies	*V*		*V*		*V*	
SIC dummies	*V*		*V*		*V*	
N	2427		4769		4769	
R-squared	0.11		0.29		0.10	

Table 2 reports the results from a set of regressions where different firm quality measures are tested individually. Note, however, that as in Saunders and Srinivasan (2001) dummies are included in all regression to control for the year of the announcement of the transaction and for the industry of the acquirer.

The regressions above seem to support the hypotheses laid out in Section 3.3. As suggested in Hypothesis 1, deal value is increasing in the ability of the advisor. Similarly, market capitalization exhibits positive relation with investment bank ability, as put forth in Hypothesis 2. Subsequent deal dummy, which tells whether the acquirer engaged in one or more M&A deals in the three years following the present deal, is also positively related to advisor ability. All these relations are statistically significant at the 1% level.

Of the generic firm quality variables cash ratio and growth rate of sales are not significantly related to the ability of the investment bank but still have the expected signs. The other variables are as expected and statistically significant lending credibility to Hypothesis 4. Hypothesis 5 also receives support from the results, as volatility is statistically significantly negatively related to investment bank ability.

One of the variables in Table 2 may intuitively appear to have the wrong sign. Namely, one might expect that firms associated with more reputable investment banks would have lower leverage, i.e. the sign of the leverage coefficient would be negative, and thus the statistically significant positive coefficient in the regression below may seem counterintuitive. However,

Comment and Schwert (1995) found in their study leverage to be negatively related to the likelihood that a firm is taken over. They relate this finding to target firms having financial slack and making inefficient use of their financial capital and hence being taken over by more efficient firms. Therefore the positive relation between leverage and investment bank ability is consistent with Comment and Schwert (1995).

Taken together, the results from the regressions with individual variables support the first five hypotheses laid out in Section 3.3 regarding the association of firms and investment banks. More able investment banks appear to be associated with larger transactions and not only with bigger but also better firms that are more likely to be active in M&A in the future. This is consistent with positive assortative matching and thus with the model presented in Section 3.1. The matching pattern consequently seems to be one where firm quality and investment bank ability are positively correlated.

Given that the sample of observed firm-investment bank pairs is skewed towards the end of the sample period, in unreported specifications I also run the regressions on two subsamples, one covering years 1984-1993 and the other years 1994-2000. The results don't change materially, although some variables are bit weaker in terms of statistical significance in the former subperiod.

However, the variables that are tested individually above may well exhibit correlation with each other, which might explain the results observed. Therefore, and in order to gain further insight into the matching process, these variables are next tested in a multivariate framework, i.e. they are included in the same regressions. This should yield information on the marginal contributions of the individual variables.

A trap one might fall into in a multivariate framework is multicollinearity. That is, correlation between variables in the regression might introduce instability to the results. Hence, to preclude multicollinearity in the multivariate regressions we exclude two variables from the rest of the analysis. A correlation matrix of the variables used in the multivariate regressions is presented below in Table 3.

The table shows that P/E and P/B as well as cash ratio and leverage are relatively strongly correlated with each other with R-squares being over 0.40. Given that P/E and cash ratio are,

respectively, the variables that exhibit the weaker statistical significance in the two pairs above, they are dropped from the regressions in Table 4. I also note the high correlation of 0.37 between market capitalization and deal value. However, both variables are essential in the context of the suggested hypotheses and are thus included. Furthermore, Fernando, Gatchev and Spindt (2004) include both market capitalization and issue proceeds in their regressions even though the correlation between these is over 0.80.

Table 3
Correlation matrix
This table shows the correlations of the variables used in Table 2. Construction of the variables is explained in Section 4.2.

	Log of market cap	Log of deal value	CAGR of sales	Volatility	Hostile deal dummy	Stock dummy	Leverage	P/B	Subsequent deal dummy	Subsequent deal flow	Flow with the same advisor	Cash ratio	P/E
Log of market cap	1.00												
Log of deal value	0.37	1.00											
CAGR of sales	-0.15	0.01	1.00										
Volatility	-0.27	-0.18	0.36	1.00									
Hostile deal dummy	0.05	0.18	-0.02	-0.02	1.00								
Stock dummy	-0.04	0.19	0.18	0.10	-0.06	1.00							
Leverage	0.09	0.14	-0.07	-0.29	0.02	-0.04	1.00						
P/B	0.21	0.03	0.26	0.14	-0.04	0.10	-0.14	1.00					
Subsequent deal dummy	0.20	-0.07	-0.02	-0.05	0.01	-0.03	0.06	0.18	1.00				
Subsequent deal flow	0.19	-0.10	-0.04	-0.09	0.04	-0.06	0.12	0.18	0.72	1.00			
Flow with the same advisor	0.08	-0.22	-0.13	-0.15	0.02	-0.13	0.12	0.10	0.49	0.71	1.00		
Cash ratio	0.06	-0.18	-0.01	0.26	-0.04	-0.02	-0.41	0.22	0.08	0.05	0.13	1.00	
P/E	0.11	0.06	0.29	0.12	-0.01	0.15	-0.03	0.48	0.11	0.10	0.04	-0.01	1.00

Table 4: Firm quality and investment bank ability in a multivariate framework

This table examines observed firm-investment bank pairs and the relation of firm quality measures and investment bank ability in a multivariate framework. General sample is drawn from SDC Platinum and covers years from 1984 to 2003. However, in order to avoid horizon bias related to using variables based on subsequent deals, only firm-investment bank pairs from 1984 to 2000 are examined. Dependent variable in the OLS regressions below is the ability of the investment bank that acted as an advisor to the acquirer in the corresponding transaction. Megginson-Weiss reputation value is used as a proxy for investment bank ability and is based on the logarithm of US dollar value of the transactions in the last three years in which the investment bank had an advisory role over the logarithm of the total US dollar value of transactions in the same period. This variable is defined formally in Section 4.2. Independent variables relate to the acquirer that the investment bank advised and to the corresponding transaction. Market capitalization is as of end of the last fiscal year preceding the announcement of the transaction. Deal value is the value of the transaction including net debt. Volatility is the volatility of the share price in the last fiscal year preceding the transaction. CAGR of sales is calculated over the last four fiscal years preceding the transaction. Leverage and P/B are similarly calculated as averages over the last four years. Stock deal dummy is set to 1 if the 50% or more of transaction was equity financed and is otherwise set to 0. Hostile dummy is set to 1 if the transaction was hostile and is 0 otherwise. Subsequent deal dummy takes a value of 1 if the firm announced one or more deals in the three years following the present transaction and is 0 otherwise. Subsequent deal flow is the logarithm of value in US dollars of all the transactions that the firm announced in the three years following the present transaction. Flow with the same advisor is the logarithm of value in US dollars of all the transactions that the firm announced in the three years following the present transaction in which the firm used the same advisor as in the present transaction. In calculating the variables all dollar amounts are expressed in 2000 US dollars using the GDP implicit price deflator. Dummies are included to control for the year during which the transaction was announced and for the firm's industry using the first digit of the firm's primary SIC code. T-values are from a two-tailed t-test and given next to the respective coefficients. ***, **, * denote statistical significances at the 1%, 5% and 10% levels, respectively.

Dependent variable	Investment bank Megginson-Weiss reputation					
Panel A	I		II		III	
	Coefficient	t value	Coefficient	t value	Coefficient	t value
Intercept	64.78***	8.73	64.85***	8.72	63.04***	8.64
Log of market cap	1.90***	3.33	1.91***	3.36	1.87***	3.37
Log of deal value	7.83***	13.00	7.80***	12.99	8.02***	13.37
Volatility	-2.97	-1.02	-2.94	-1.01	-2.14	-0.73
Leverage	0.86	1.13	0.82	1.07	0.66	0.87
CAGR of sales	3.92	0.65	3.87	0.64	4.26	0.71
P/B	2.35	0.99	2.31	0.97	1.64	0.69
Stock dummy	-2.84***	-3.44	-2.83***	-3.43	-2.79***	-3.40
Hostile deal dummy	-2.19	-1.02	-2.21	-1.03	-2.38	-1.12
Subsequent deal dummy	1.11	1.39				
Subsequent deal flow			0.14	1.29		
Flow with the same advisor					0.66***	3.76
Year dummies	*Y*		*Y*		*Y*	
SIC dummies	*Y*		*Y*		*Y*	
N	1327		1327		1327	
R-squared	0.31		0.31		0.32	

Table 4 – continued

Dependent variable	Investment bank Megginson-Weiss reputation					
Panel A - continued	IV		V		VI	
	Coefficient	t value	Coefficient	t value	Coefficient	t value
Intercept	61.26***	8.15	56.71***	7.12	-3.49	-0.26
Log of market cap	1.89***	3.32	2.59***	4.19	9.21***	6.91
Log of deal value	8.68***	12.96	7.83***	13.07	38.01***	7.30
Volatility	-2.22	-0.76	-2.30	-0.79	-2.37	-0.82
Leverage	0.70	0.92	0.78	1.03	0.63	0.83
CAGR of sales	3.12	0.52	3.43	0.57	0.74	0.12
P/B	2.42	1.02	2.07	0.87	3.48	1.49
Stock dummy	-2.75***	-3.34	-2.79***	-3.39	-2.61***	-3.20
Hostile deal dummy	-2.15	-1.01	-2.27	-1.06	-1.73	-0.82
Subsequent deal flow	1.01***	3.20	4.67***	2.89		
Subsequent flow * deal value	-0.36***	-2.93				
Subsequent flow * market cap			-0.46***	-2.81		
Market cap * deal value					-3.18***	-5.85
Year dummies	*V*		*V*		*V*	
SIC dummies	*V*		*V*		*V*	
N	1327		1327		1327	
R-squared	0.32		0.32		0.33	

Table 4 shows the results of multivariate regressions with the whole sample. In addition to the variables used in the regressions reported in Table 2, some new variables are also added. First, dummies for payment method (stock) and for deal attitude (hostile) are included as control variables in the spirit of previous literature (see, for instance, Servaes and Zenner (1996) and Kale, Kini and Ryan (2003)). Second, two new variables are added to be used as alternative proxies for subsequent M&A activity of the acquirer. This is motivated by the notion that a crude dummy, which can only take two values, may not correctly capture differences in the intensity of subsequent M&A activity. Finally, three interaction terms are also added. These are included to test whether some of the variables are substitutes for each other.

The first thing to note about specifications I-III in Panel A is that most variables lose their significance. Of the variables that were tested individually in Table 2 only market capitalization and deal value are statistically significant. As expected, both appear to be positively related to investment bank ability. The lack of statistical significance with most variables implies that

although they are related to investment bank ability, as shown in Table 2, their marginal contribution in a multivariate framework is negligible.

Of the new variables added only stock dummy and subsequent deal flow with the same advisor are significant. However, the latter may be explained by more able investment banks having more loyal clients, as suggested by the findings of Saunders and Srinivasan (2001). Indeed, in unreported tests I find that first-tier investment banks have an advisory role in significantly (at the 1% level) higher share of the subsequent deal flow of their clients than either second- or third-tier banks. There is no statistically significant difference between the latter two tiers. Therefore, even if two banks have clients with identical subsequent deal flow, the more able bank is likely to enjoy higher subsequent flow as it captures a higher share of its client's flow. Hence, in specifications IV-VI subsequent deal flow is used instead of flow with the same advisor.

The idea for specifications IV-VI stems from Hypotheses 1-3, which suggest that deal value, market capitalization and subsequent activity all contribute to the joint surplus. Furthermore, their contribution was assumed to come from the scale of resources effect. As a result they may also be substitutes for each other. This is tested in specifications IV-VI in Panel A. The proxy for subsequent activity in these specifications is subsequent flow. In unreported specifications I also test the two other proxies for subsequent activity, but while results are qualitatively similar, statistical significance is weaker.

The results in Table 4 suggest that deal value, market capitalization and subsequent activity indeed act as substitutes for each other in determining which firm pairs with which investment bank. All the three interaction terms that are tested are negative and statistically significant. Furthermore, while subsequent deal flow is insignificant in specifications I-III, it becomes significant when an interaction term is added. More specifically, it appears to be a substitute for both deal value and market capitalization. Similarly the results suggest that deal value and market capitalization are substitutes for each other. I also test if including both a dummy for whether the firm did any deals and a continuous variable for the subsequent flow in the same regression changes results. Including the two proxies for subsequent activity alongside interactions term has no marked effect on results and therefore these specifications are not reported. Finally, as with the specifications on Table 2, I run the same regressions on two subsamples, one covering years 1984-1993 and the other years 1994-2000. The results mainly

hold across the different time periods but the substitution effects are not statistically significant in the former period.

Overall the results in Table 4 give strong support for Hypothesis 1-3, which rely on the scale of resources effect, but fail to lend credibility to Hypotheses 4 and 5, which test other firm quality measures. This suggests that scale of resources effect is the driving force behind firm-investment bank association and that the marginal contribution of other factors is negligible.

5.3 Market share of high reputation investment banks

Hypothesis 6 put forth that the market share of more able investment banks would be negatively related to the overall M&A activity when both market share and overall activity are measured in terms of number of deals. This predicted negative relation is a direct implication of the fact that the model presented in this thesis is a matching model that assumes positive assortative matching. Namely, when the matching pattern is positive assortative, pair formation always starts from the top, i.e. best agents match first, the next best agents second and so on. To be precise, the model presented assumes that a given investment bank can simultaneously advise multiple firms up to an exogenously determined capacity constraint and therefore in the context of this model the best agent from one set may actually match with several best agents from the other set as long as it has capacity left. However, whether the advisory capacity of an investment bank is assumed to be one or multiple firm does not really change the underlying logic of the matching pattern.

That is, the best investment bank will match with the best firm and then with second, third and so on best firms until it reaches its capacity limit. Once this happens, the second best investment bank will start matching with the firms that are still unmatched and this will continue in a similar manner until it reaches its capacity limit. Therefore, if an investment bank of a given ability is matched with a firm, it implies that all higher ability investment banks have already reached their capacity limit. Consequently, if the number of firms is increased the addition will not be served by the best investment banks but rather by lower ability investment banks that still have capacity left. As a result, the higher the number of firms in need of an advisor the lower the percentage of which them are matched with the best investment banks.

Table 5: Market share of high reputation investment banks and relation to overall M&A activity

This table examines the overall M&A activity and the combined market share of most able investment banks. The sample is drawn from SDC Platinum and covers 20 years from 1984 to 2003. Dependent variable in the OLS regressions below is the combined market share of the investment banks with the 5, 7 and 10 highest abilities in year *t*. Megginson-Weiss reputation value is used as a proxy for investment bank ability and is based on the logarithm of US dollar value of the transactions in the last three years in which the investment bank had an advisory role over the logarithm of the total US dollar value of transactions in the same period. This variable is defined formally in Section 4.2. Market share is measured as the number of deals in year *t* in which a given investment bank had an advisory role over the total number of deals in that year. Independent variable is the log of total number of deals in the corresponding year. T-values from a two-tailed t-test are given in parentheses under the respective coefficients. ***, **, * denote statistical significances at the 1%, 5% and 10% levels, respectively.

Dependent variable	Market share of top investment banks in year *t*		
	Top 5	Top 7	Top 10
Intercept	69.21***	83.21***	93.99***
	(5.28)	(5.12)	(4.90)
Log of total number of deals in year *t*	-0.04***	-0.05***	-0.07***
	(-3.55)	(-3.66)	(-3.97)
Number of years	20	20	20
R-Squared	0.41	0.43	0.47

Table 5 reports the results from regressions where the combined market share of high reputation investment banks in a given year is regressed against the total number of transactions in that same year (as in Fernando, Gatchev and Spindt (2004), I use the log of total number of deals). As mentioned above, the model presented in Section 3.1 suggests that when the total number of deal increases, the market share of high reputation investment banks should decrease as they reach their capacity constraint and cannot serve more firms. In order to ensure that the results do not depend on the definition of high reputation investment banks, I run the regressions using the combined market share of top five, seven and ten banks when ranked by Megginson-Weiss reputation value in a given year.

The results in Table 5 support the prediction of the model and hence Hypothesis 6. The market share of high reputation investment banks is, indeed, negatively related to the overall activity in the market. This finding holds regardless of whether the combined market share of top five, seven or ten investment banks is used as the dependent variable. Note that the high values of intercepts are a result of both acquirer- and target-side investment banks receiving marks from individual deals. However, this should not bias the results.

Thus, it appears that, as stipulated by positive assortative matching, the best investment banks reach their capacity limit first and unmatched firms move down in the hierarchy until they find a bank that has capacity left for them.

5.4 Client quality of high reputation investment banks

Hypothesis 7 advanced that more able investment banks would match with better firms the higher the average and variance of the overall firm quality and the higher the number of firms in the market. This again follows from positive assortative matching as best investment banks will always match with the best firms regardless of their absolute attributes. For instance, assume that the best investment bank can serve, say, the 20 best firms. If the variance of firm quality increases, i.e. firm quality distribution widens, the 20 best firms are likely to be farther away from average. If the average doesn't change, the absolute quality in the better end of the distribution will become higher.

Table 6: High reputation investment banks' client quality and relation to overall firm quality

This table examines the quality of the clients of most able investment banks and overall quality of firms in the market. The sample is drawn from SDC Platinum and covers years from 1984 to 2003. Dependent variable in the OLS regressions below is the average log of deal value in deals in which investment banks with the 5, 7 and 10 highest abilities in year *t* had an advisory role. Megginson-Weiss reputation value is used as a proxy for investment bank ability and is based on the logarithm of US dollar value of the transactions in the last three years in which the investment bank had an advisory role over the logarithm of the total US dollar value of transactions in the same period. This variable is defined formally in Section 4.2. Independent variables measure the average and standard deviation of deal values as well the total number of deals in year *t*. T-values from a two-tailed t-test are given in parentheses under the respective coefficients. ***, **, * denote statistical significances at the 1%, 5% and 10% levels, respectively.

Dependent variable	Average log of deal value for top investment banks in year *t*		
	Top 5	Top 7	Top 10
Intercept	-3292197***	-2917253***	-2480395***
	(-7.71)	(-7.78)	(-7.77)
Average log of deal value in year t	1900303***	1767115***	1499472***
	(3.15)	(3.33)	(3.33)
St. deviation of log of deal value in year t	289119**	251106**	215522**
	(2.76)	(2.73)	(2.75)
Log of total number of deals in year t	450039***	382360***	324455***
	(3.54)	(3.43)	(3.42)
Number of years	20	20	20
R-Squared	0.81	0.81	0.81

Similarly if the number of firms in the market increases, the 20 best firms will represent a smaller percentage of the total, meaning that these 20 firms are likely to be of higher average quality than the 20 best in a smaller total market. The relationship between average firm quality in the market and the average quality of firms matching with high reputation investment banks is more straightforward and hence easier to grasp.

Table 6 examines the predictions of Hypothesis 7. Firm quality is proxied by deal value as this appears to be the strongest driver of matching in Tables 2 and 4. Dependent variable is the average value of a deal in which a high reputation investment banks acted as advisor in a given year. Again, in order to ensure that the results do not depend on the definition of high reputation investment banks, I run the regressions using the combined market share of top five, seven and ten banks when ranked by Megginson-Weiss reputation value in a given year. All the independent variables are included in the same regressions in order to gain insights to their marginal.

As expected the average quality of firms in the market is positively related to the average quality of high reputation investment banks' clients. This finding is statistically significant at the 1% level and does not depend on the definition of high reputation investment banks. In fact, the relation should hold across all investment banks. In other words, if the absolute quality of firms in the market increases, then an investment bank of a given rank should expect to match with a firm of higher absolute quality.

Variation in firm quality is also significantly (at the 5% level) related to high reputation investment banks' client quality. As predicted, the larger the dispersion in firm quality, the higher the average client quality of high reputation investment banks. However, unlike above, this positive relation should not hold across all investment banks, but should only apply to top banks. Indeed, the relation should be negative for the poorest investment banks as these serve the firms in the left-tail of quality distribution.

The number of transactions is also, as expected, positively related to the quality of high reputation investment banks' clients suggesting that when the number of firms looking for an advisor increases the best investment banks will match with firms of higher absolute quality. This results from these banks having reached their capacity limit. This relation is statistically

significant at the 1% level and, as the other findings, holds across different definitions of high reputation investment banks.

The last finding is in an interesting contrast with the results in Table 5. That is, there the number of firms in the market was found to be negatively related to high reputation investment banks' market share while in Table 6 it is positively related to the average quality of high reputation investment banks' clients. Hence, it would appear that a change in the number of firms in the market would have an ambiguous effect on high reputation investment banks' relative position. On one hand they lose in terms of their share of firms in the market. But on the other hand they also gain in terms of the quality of their average client. Whether the effect on their share of the total market when the market is measured in terms of dollar value of deals is positive or negative would thus seem to depend on the interplay of the two aforementioned effects.

5.5 Fee determination

The last two hypotheses were related to the determination of fees. Given that the model presented in this thesis is an assignment model, it implies that transfer payments, fees in this case, are negotiated after the match and do not drive the matching itself. Consequently the exact fees are a result of bargaining between the matched firm and investment bank. As the joint surplus arising from the matching is assumed to be related to deal size, fees as percentage of the deal value (percentage fees) can be seen as a proxy for the relative share of the surplus. Should investment bank hold an advantage in the fee negotiations, it should be able to press for a larger share of the surplus, i.e. for higher percentage fees. On the other hand, should firm have the upper hand, then percentage fees could be expected to be lower.

The regressions in Table 8 examine these ideas. Dependent variable is the percentage fees in a given deal. Hypotheses 8 and 9 put forth that percentage fees should be increasing in investment bank ability and decreasing in deal value. These two are included as independent variables. Market capitalization of the firm is also included as an independent variable as it might effect the relative bargaining positions. Additional control variables are included to control for hostility and multiple bidders as McLaughlin (1992) finds these to be related to fees. As a robustness check, the regressions are run for the whole period as well for two subperiods.

Table 7: Percentage fees and bargaining between firms and investment banks

This table examines observed firm-investment bank pairs and the fees paid to the investment bank as a percentage of deal value. General sample is drawn from SDC Platinum and covers years from 1984 to 2003. However, in order to avoid horizon bias related to using variables based on subsequent deals, only firm-investment bank pairs from 1984 to 2003 are examined. Dependent variable in the OLS regressions below is fees paid in a given transaction as percentage of the dollar value of that transaction. Of the independent variables, market capitalization is as of end of the last fiscal year preceding the announcement of the transaction. Deal value is the value of the transaction including net debt. Multibidder dummy takes a value of 1 if the deal involved more than bidder and is 0 otherwise. Hostile dummy is set to 1 if the transaction was hostile and is 0 otherwise. Megginson-Weiss reputation is a proxy for investment bank reputation and is based on the logarithm of US dollar value of the transactions in the last three years in which the investment bank had an advisory role over the logarithm of the total US dollar value of transactions in the same period. In calculating the variables all dollar amounts are expressed in 2000 US dollars using the GDP implicit price deflator. ***, **, * denote statistical significances at the 1%, 5% and 10% levels, respectively.

Dependent variable	Fee as a percentage of deal value					
	1984-2000		1984-1993		1994-2000	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Intercept	4.02**	1.97	1.08**	2.51	8.67	1.42
Log of market cap	0.09	0.53	0.01	0.32	0.32	0.72
Log of deal value	-1.53***	-5.39	-0.67***	-10.50	-3.59***	-3.94
Multibidder dummy	2.32***	3.59	0.30*	1.65	3.62**	2.30
Hostile dummy	-0.80	-1.11	-0.17	-0.83	-0.29	-0.17
Megginson-Weiss reputation	0.03**	2.40	0.01***	4.48	0.09*	1.77
Year dummies	*V*		*V*		*V*	
SIC dummies	*V*		*V*		*V*	
N	862		584		278	
R-squared	0.10		0.20		0.17	

The results in Table 8 seem to be in line with Hypotheses 8 and 9. Both deal value and investment bank ability are related to percentage fees as expected. All else equal, the higher the deal value, the lower the percentage fees. Correspondingly, all else equal, the higher the investment bank ability, the higher the percentage fees. Deal value is statistically significant at the 1 % level in the whole period as well in both subperiods. Investment bank ability is similarly statistically significant in all specifications, although the statistical significance is somewhat weaker than that of deal value. Consistent with McLaughlin (1992), multibidder dummy is positively related to percentage fees. This relation is statistically significant in all specifications. However, unlike in McLaughlin (1992), although it has the expected sign, deal hostility appears to have no statistically significant relation to percentage fees.

6. Summary and conclusions

As stated in the beginning, this thesis has two objectives. First, the aim is to present a model for firm-investment bank matching and discuss its applicability to the market for M&A advisory services. Second, this thesis seeks to empirically examine the model and provide new evidence on the matching of firms and investment banks in M&A advisory.

Accordingly, I first present a model for firm-investment bank matching. The model is based on two-sided matching and hence departs from the extant literature which has largely assumed the matching to be one-sided. More specifically, the present model assumes that firms and investment banks solve a common assignment problem by associating by mutual choice with the matching pattern being positive assortative, in other words one in which investment bank ability and firm quality are positively correlated. The concept of two-sided matching is not new in economics and the model presented in this thesis is virtually identical in its notations with the model Fernando, Gatchev and Spindt (2004) develop for equity underwriting services. However, there are differences in the definition of the surplus with the present model and theirs. This leads me to investigate the role of subsequent activity as a determinant of the matching.

Having presented the model, I then turn to examining it. The model has direct and indirect empirical implications. Direct implications are related to the matching pattern, which is assumed to be positive assortative. Indirect implications span the market share and client quality of high reputation investment banks as well as determination of fees. The implications are tested using OLS regressions with a rich data set comprising of 5713 firm-investment bank pairs from the United States from 1984-2003. However, it should be emphasized that by testing the model this thesis does not seek to explicitly reject some other view, for instance a view based on one-sided selection. In fact, it would be extremely difficult to formulate hypotheses that would be able to differentiate between one-sided and two-sided matching.

Examining the results, I note that the observed matching pattern is largely consistent with the model. As predicted by positive assortative matching, I find investment bank ability being positively related to firm and deal size both when they are tested individually and in a multivariate framework. On the other hand, so called generic firm quality variables, such as P/B ratio, fail to exhibit significance in a multivariate framework. Similarly volatility loses its significance in a multivariate framework suggesting that the matching is primarily driven by the

scale of resources effect. However, these findings are not particularly interesting as the roles of firm and deal size have already been observed previously by Servaes and Zenner (1996) and Rau and Rodgers (2002). More interestingly, the present model also implies that firm size, deal size and the subsequent M&A activity of the firm may be substitutes for each other, as their contribution to the surplus comes through the scale of resources effect. Testing this, I indeed observe that firm size and deal size are substitutes for each other. Moreover, so are firm size and subsequent activity as well as deal size and subsequent activity.

These findings suggest that even a small firm may be able to match with a high reputation investment bank if the deal it seeks to complete is large enough. Correspondingly, a high reputation investment bank may advise on a small deal if the firm seeking to complete it is large enough. Finally, a high reputation investment bank may also match with a small firm or deal if the subsequent deal flow is sufficiently high. Although likely to receive only a yawn from practitioners, these findings on the substitution effects between aforementioned variables are new to the academic literature on M&A advisory services. The finding on the role of subsequent deal flow is particularly interesting as no prior study has considered its effect on observed firm-investment bank pairs.

Positive assortative matching has also indirect implications. First, the model implies that because high reputation investment banks reach their capacity limit first, they are unable to serve additional firms and should see their share of the number of firms shrink in a more active market, i.e. when there are more firms seeking advisors. Second, as the matching is based on relative rather than absolute qualities, the client quality of high reputation investment banks should be positively related to overall firm quality in the market. Third, since fees do not drive the matching but are determined in a bargaining after the match, the exact fees should be related to the bargaining power of the matched parties.

All these predictions appear consistent with empirical evidence. I find the market share of high reputation investment banks to be negatively related to the number of firms in the market. Furthermore, the client quality of high reputation investment banks is positively related to the mean and variance of overall firm quality as well as to the number of firms in the market. Finally, percentage fees are increasing in the ability of the investment bank and decreasing in the size of the deal. While McLaughlin (1992) and Saunders and Srinivasan (2001) report similar results on fees, the dynamics of high reputation investment banks' market share and

client quality have remained thus far unexplored in the M&A advisory literature. Hence the first two findings are new to the literature.

Taken together, both direct and indirect implications of the model seem to be consistent with observed empirical regularities. Thus, while I'm unable to conclude that a two-sided view on firm-investment bank matching would be more accurate than one-sided view, I can note that the two-sided model presented here appears to perform well in predicting empirical regularities. Moreover, casual experience and the views of practitioners would tend to suggest that the matching of firms and investment banks is better depicted by a two-sided rather than one-sided model.

The findings of this thesis also raise some issues that future research on M&A advisory services should take into account. For one, studies in the spirit of Servaes and Zenner (1996) should note that firm size and deal size may be substitutes for each other and that subsequent M&A activity plays a role in determining the observed firm-investment bank pairs, something no prior study has recognised. Furthermore, studies examining intertemporal changes in the market share and client quality of individual investment banks should consider that, in addition to fluctuations in the characteristics of the overall market, the changes may also be dependent on a given investment bank's position in the industry hierarchy.

Unsurprisingly, the findings of this thesis are in line with those of Fernando, Gatchev and Spindt (2004) who test a virtually identical model in the market for equity underwriting services. Drawing on their paper, an interesting area for future research, which has not been considered in this thesis, is switching. Namely, the model presented implies that firms will match with different investment banks if the characteristics of either side of the match change sufficiently. On the other hand, Saunders and Srinivasan (2001) suggest that there are benefits related to continuing relationships. The interplay of these two effects would most likely prove a fruitful ground for a close examination.

In addition, Fernando, Gatchev and Spindt (2004) suggest developing a structural system of simultaneous equations to model the joint choice of issuers and underwriters as a path for ongoing research. As such a system would most likely be interesting to develop to suit M&A advisory as well, I point out two things. First, an example of the use of simultaneous equations to model demand and supply in a similar industry can already be found. That is, Copley, Gaver

and Gaver (1995) investigate accounting firms and their clients using simultaneous equations. The accounting industry shares many similarities with investment banking and hence their paper can offer ideas in terms of methodology and implementation. Second, a system of simultaneous equations should take a sufficiently holistic view to the relationships between firms and investment banks, taking into account factors that have not been explicitly covered in this thesis but which may still have a role. This is motivated by recognising that today most investment banks seek to provide a wide array of services to their clients. These may include, for example, financing (see Drucker and Puri (2003)) and analyst coverage (see Ellis, Michaely and O'Hara (2004)), although the latter service may have lost its significance due to recent regulations. I leave it to future research to consider these issues.

References

Allen, F. (1984): Reputation and product quality, *RAND Journal of Economics* 15, 311-327.

Allen, L., J. Jagtiani, S. Peristiani, and Saunders, A. (2003): The role of bank advisors in mergers and acquisitions, *Journal of Money, Credit, and Banking*, forthcoming.

Anand, B. and Galetovic, A. (2002): Does competition kill relationships? Inside investment banking, *Harvard Business School,* working paper.

Baker, W. (1990): Market networks and corporate behaviour, *American Journal of Sociology* 96, 589–625.

Bataillon, M. (2004): When a firm is not stupid enough, *Financial News*, http://www.efinancialnews.com/index.cfm?nav=2&action=view_article&passedref=185000 00000048142 (requires password).

Beatty, R. P., Bunsis, H. and Hand, J. (1998): The indirect economic penalties in SEC investigations of underwriters, *Journal of Financial Economics* 50, 151-186.

Beatty, R.P. and Ritter, J.R. (1986): Investment banking, reputation, and the underpricing of initial public offerings, *Journal of Financial Economics* 15, 213-232.

Becker, G. (1973): A theory of marriage: part I, *Journal of Political Economy* 81, 813-846.

Benston, G. and Smith, C. (1976): A transactions cost approach to the theory of financial intermediation, *Journal of Finance* 31, 215-231.

Benveniste, L., Ljungqvist, A., Wilhelm, W. and Yu, X. (2003): Evidence of information spillovers in the production of investment banking services, *Journal of Finance* 58, 577-608

Bowers, H. M. and Miller, R. E. (1990): Choice of investment banker and shareholders' wealth of firms Involved in acquisitions, *Financial Management* 19, 34-44.

Boot, A. (2000): Relationship banking: What do we know?, *Journal of Financial Intermediation* 9, 7–25.

Burson-Martsteller (2004), http://www.bm.com/pages/insights/pubs/articles/as-05-01-2003.

Campbell, T. and Kracaw, W. (1980): Information production, market signalling, and the theory of financial intermediation, *Journal of Finance* 35, 863-822.

Comment, R. and Schwert, G.W. (1995): Poison of placebo? Evidence on the deterrance and wealth-effects of modern antitakeover measures, *Journal of Financial Economics* 39, 3-43.

Copley, P., Gaver, J. and Gaver, K. (1995): Simultaneous estimation of the supply and demand of differentiated audits: evidence from the municipal audit market, *Journal of Accounting Research* 33, 137-155.

Chemmanur, T. and Fulghieri, P. (1994): Investment bank reputation, information production, and financial intermediation, *Journal of Finance* 49, 57-80.

Currie, A. and Morris, J (2001): Universal banks, *Euromoney* October 2001 Issue 390, 92-101.

Douglas, A. (1998): J.P. Morgan sets sights on more profits, *Wall Street Journal* February 25 1998, C1.

Drucker, S. and Puri, M. (2003): Tying knots: Lending to win equity underwriting business, *Stanford University*, working paper.

Ellis, K., Michaely, R. and O'Hara, M. (2004): Competition in investment banking: proactive, reactive, or retaliatory?, *University of California*, working paper.

Fernando, C., Gatchev, V. and Spindt, P. (2004): Wanna dance? How firms and underwriters choose each other, *Journal of Finance* forthcoming.

Gale, D. and Shapley, L.S. (1962): College admissions and the stability of marriage, *American Mathematical Monthly* 69, 9-15.

Gelissen, J. (2003): Assortative mating after divorce: a test of two competing hypotheses using marginal models, *Social Science Research* 33, 361-384.

Graig, S. (2004): Lehman extends reach in Wall Street jungle to catch bigger rivals, *Wall Street Journal Europe* October 13 2004, A8.

Habib, M. and Ljungqvist, A. (2001): Underpricing and entrepreneurial wealth losses in equity issue:s theory and evidence, *Review of Financial Studies* 14, 433-458.

Harford, J. (1999): Corporate cash reserves and acquisitions, *Journal of Finance* 54, 1969-1997.

Hunter, W. and Walker, M. (1990): An empirical examination of investment banking merger fee contracts, *Southern Economic Journal* 56, 1117-1130.

Jovanovic, B. and Rousseau, P. (2002): The Q-theory of mergers and acquisitions, NBER working paper no. 8740.

Kale, J., Kini, O. and Ryan, H. (2003): Financial advisors and shareholder wealth gains in corporate takeovers, *Journal of Financial and Quantitative Analysis* 38, 475-501.

Kale, J., Kini, O. and Ryan, H. (1998): On the participation and reputation of financial advisors in corporate acquisitions, *Georgia State University*, working paper.

Klein, B. and Leffler, K. (1981): The role of market forces in assuring contractual performance, *Journal of Political Economy* 89, 615-641.

Krigman, L., Shaw, W. and Womack, K. (2001): Why do firms switch underwriters?, *Journal of Financial Economics* 53, 409-437.

Legros, P. and Newman, A. (2002): Monotone matching in perfect and imperfect worlds, *Review of Economic Studies* 69, 925-942.

Leland, H. and Pyle, D. (1977): Informational asymmetries, financial structure, and financial intermediation, *Journal of Finance* 32, 371-387.

McLaughlin, R. (1990): Investment-banking contract in tender offers: an empirical analysis, *Journal of Financial Economics* 28, 209-232.

McLaughlin, R. (1992): Does the form of compensation matter? Investment banker fee contracts in tender offers, *Journal of Financial Economics* 32, 223-260.

Megginson, W. and Weiss, K. (1990): Venture capitalist certification in initial public offerings, *Journal of Finance* 46, 879-904.

Michel, A., Shaked, I. and Lee, Y.-T. (1991): An evaluation of investment banker acquisition advise: the shareholders' perspective, *Financial Management* 20, 40-49.

Moeller, S., Schlingemann, F. and Stulz, R. (2004) : Firm size and the gains from acquisitions, *Journal of Financial Economics*, forthcoming.

Nanda, V. and Yun, Y. (1997): Reputation and financial intermediation. An empirical investigation of the impact of equity issue mispricing on underwriter market value, *Journal of Financial Intermediation* 6, 39-63.

Rau, P. R. (2000): Investment bank market share, contingent fee payment, and the performance of acquiring firms, *Journal of Financial Economics* 56, 293-324.

Rau, P. R. and Rodgers, K. J. (2002): Do bidders hire top-tier investment banks to certify value? *Purdue University*, working paper.

Rosen, S. (1981): The economics of superstars, *The American Economic Review* 71, 845-858.

Roth, A.E. and Sotomayor, M. (1990): Two-sided matching: a study in game-theoretic modeling and analysis, *Cambridge University Press.*

Roy, A. (1950): The distribution of earnings and of individual output, *Economic Journal* 60, 489-505.

Saigol, L and Wells, D. (2004):Hostile bids are back, *Financial Times* February 18 2004, 11.

Saigol, L. (2004): DIY deal-makers shun M&A advisers, *Financial Times* October 11 2004, 16.

Sattinger, M. (1993): Assignment model of the distribution of earnings, *Journal of Economic Literature* 31, 831-880.

Saunders, A. and Srinivasan, A. (2001): Investment banking relationships and merger fees, *University of Georgia Department of Banking and Finance*, working paper.

Servaes, H. and Zenner, M. (1996): The role of investment banks in acquisitions, *The Review of Financial Studies* 9, 787-815.

Shapiro, C. (1983): Premiums for high quality products as returns to reputations, *Quarterly Journal of Economics* 98, 659-679.

Shine, R., O'Connor, D., Lemaster, P. and Mason, R. (2001): Pick on someone your own size: ontogenic shifts in mate choice by male garter snakes result in size-assortative mating, *Animal Behaviour* 61, 1133-1141.

Smith, C. (1986): Investment banking and the capital acquisition process, *Journal of Financial Economics* 15, 3-29.

Spurr, S. (1987): How the market solves an assignment problem: the matching of lawyers and legal claims, *Journal of Labor Economics* 5, 502-532.

Thomson Financial (2004): Mergers unleashed, http://www.thomson.com/cms/assets/pdfs/financial/league_table/mergers_and_acquisitions/1Q2004/press_releases/1Q04_MA_PR_Worldwide_US_Finl_Adv.pdf.

Tinbergen, J. (1951): Some remarks on the distribution of labor incomes, *International economic papers* 1, 195-207.

Titman, S. and Trueman, B (1986): Information quality and the valuation of new issues, *Journal of Accounting and Economics* 8, 159-172.